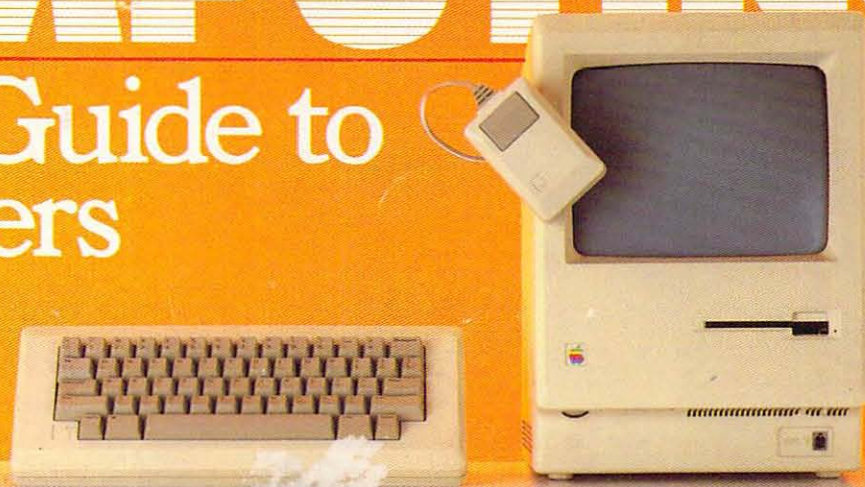


Tips for Trouble-Free
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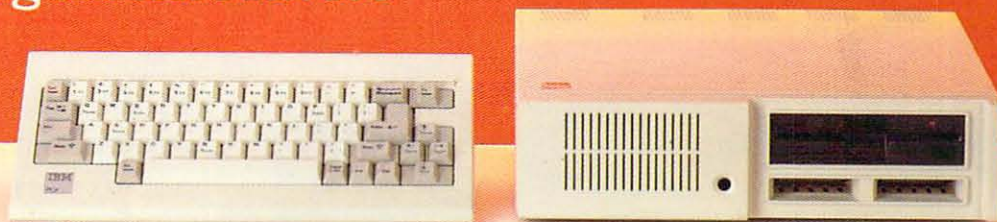
Buyer's Guide to Computers



Upgrading to a More Powerful Machine Build Writing Skills with Software



K-POWER Mini-Magazine for Kids Money Management Advice



INSIDE: ORIGINAL PROGRAMS FOR
ADAM, APPLE II SERIES, ATARI,
C 64 & VIC-20, IBM PC & PCjr, TI
TRS-80, COCO & MODULA-2



How to avoid paying your bills.

by Alan Greenspan



Alan Greenspan, Famous Economic Advisor

"The other day, a prominent politician in the executive branch of our government phoned me up.

'Alan,' he said to me, 'the budget is a mess.'

'No joke,' I said.

'Not that budget,' the prominent politician continued. 'My budget. My checking's overdrawn. They're threatening to disconnect my phones. I even got into a shouting match with my wife when I tried to lay off the servants.'

'Civil?'

'Not very. And I think I'm about to be audited. What would I show them? Who keeps receipts for embassy parties?'

At this point, we were disconnected. And although it was too late to teach proper money management to this prominent politician, there is a lesson all of us can learn from his misfortune.

Everyone has to pay their bills, and nobody likes to do it.

You can keep file folders full of bills, drawers stuffed with grocery receipts, envelopes brimming with cancelled checks, and at the end of the month, it still takes hours to figure out just where your money has gone. Not to mention how long it takes to straighten things out at the end of the year.

Well, after years of financial consulting, I've discovered a way to avoid paying your bills: let an Apple® II Personal Computer pay them for you.

There are several advantages to letting an Apple handle your finances.

It will save you time.

It will organize everything.

It will tell you, at a glance,

exactly what is going on with your money.

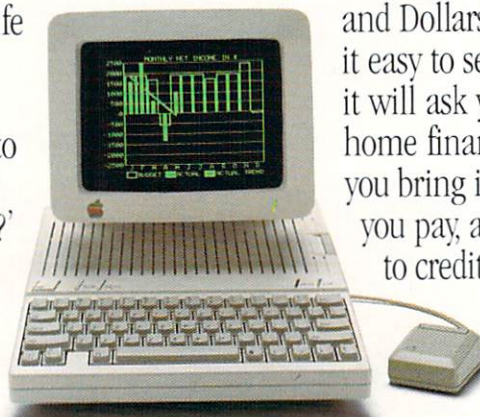
It will pay your bills, and never send you any.

And now, I'd like to turn the page over to those nice people at Apple, who will explain, in their own excruciating detail, just what I'm talking about."

The Apple II and the Home Budget.

With software programs like The Home Accountant™ and Dollars & Sense™, the Apple II makes it easy to set up household books. First, it will ask you some questions about your home finances. Like how much money you bring in each month, how much rent you pay, and whether you owe money to credit card companies, mortgage

holders, or any other surly characters. Then, it will ask you to enter some of the bills you receive each month whose prices may vary:



An Apple II will take care of everything from your household budget to your taxes with software programs like Dollars & Sense, The Home Accountant, and Tax Preparer.

phone, utilities, and the like. Then, it will ask you where you keep your money, and for the numbers of your various checking and savings accounts.

That's really all there is to it. After that, an Apple II can automatically write checks for all your fixed expenses each month. It will also tell you what other bills you can be expecting, and when you enter their costs, an Apple II will pay them, too.

An Apple II will see to it that your checkbooks remain balanced, and that you'll know when your expenses are about to exceed your income. It can even help you plan to buy a new car. Or a home.

Or a fur-lined boat, if your budget permits.

How to avoid your banker.

After the Apple II writes your checks, it can call your bank with the help of your telephone and an Apple modem. And faster than a teller can say "Next window,

With our Scribe® color/graphics printer, you can automatically print out your own checks — not to mention reports, papers, almost anything. Except money.

please," you can find out all your balances, enter deposits, see what checks have cleared, transfer money from one account to another, and even pay off some of your credit cards and other bills electronically — without ever writing a check.

So the only time you'll have to go to the bank is when you want to visit with your money, personally.

Which, when done in moderation, we can recommend most highly.

The Apple II and making money.

An Apple II can do wondrous things for your personal finances. With several different software programs, you can become your own stockbroker. Again, by



This is an Apple modem. Not much to look at, we admit; but it does let you pay bills and trade stocks by phone. It also connects your Apple II to a wealth of information services, like THE SOURCE™ and CompuServe®.

using an Apple modem, you'll gain instant access to financial news sources like *The Wall Street Journal*, *Barrons*, and the Dow Jones News/Retrieval® service. Find out what they've been saying on *Wall Street Week*. And in most cases, get up to the minute price quotes on over six thousand stocks, options, and other securities.

An Apple II lets you buy and sell securities right in your home or office, at the moment you want to make the trade. It automatically updates your portfolio and gives you detailed holding reports. It even produces charts and graphs, so you can quickly see how you and your investments are doing.

A little tax relief.

If you become perturbed everytime the subject of doing taxes comes up, an Apple II can do them for you with programs like Forecast™ and Tax Preparer™.

It can store your records, plan for the next year, and calculate your taxes.

You'll be alerted to payments you've made over the year that may be tax-deductible. It even keeps year-round records, automatically updating totals and making corrections for you. It will even print

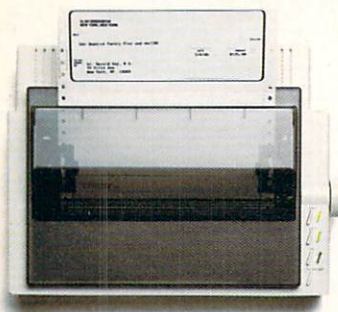
out completed tax forms that the I.R.S. will accept.

And it can do about 10,000 other things totally unrelat-

ed to taxes or this ad. So there's no telling how far an Apple II can take you.

"Well, I think that about covers it. And what if, after all of this, you still have some money left over?

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please," you can find out all your balances, enter deposits, see what checks have cleared, transfer money from one account to another, and even pay off some of your credit cards and other bills electronically — without ever writing a check.

So the only time you'll have to go to the bank is when you want to visit with your money, personally.

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The Apple II and making money.

An Apple II can do wondrous things for your personal finances. With several different software programs, you can become your own stockbroker. Again, by



It can manage your entire stock portfolio with programs like Dow Jones Investor's Workshop™ and Charles Schwab and Company's The Equalizer™. It can even show you what's going on in your bank account.*



*A note to Dr. Greenspan's relatives: He says, "Don't get excited. This isn't my real bank account." © 1985 Apple Computer, Inc. Apple and the Apple logo are registered trademarks of Apple Computer, Inc. The Home Accountant is a trademark of Continental Software. Dollars & Sense and Forecast are trademarks of Monogram. Dow Jones News/Retrieval and Dow Jones Investor's Workshop are trademarks of Dow Jones and Company. Inc. Tax Preparer is a trademark of Howard Software Services. Scribe is a registered trademark licensed to Apple Computer, Inc. THE SOURCE is a service mark of Source Telecomputing Corporation, a subsidiary of the Reader's Digest Association, Inc. CompuServe is a trademark of CompuServe Corporation, an H & R Block Company. The Equalizer and Equalizer are trademarks of Charles Schwab & Company, Inc. Spectrum is a registered service mark of the Chase Manhattan Corporation. For an authorized Apple dealer near you call (800) 538-9696. In Canada, call (800) 268-7796 or (800) 268-7637.

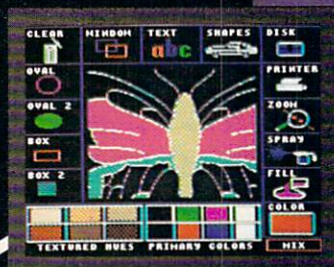
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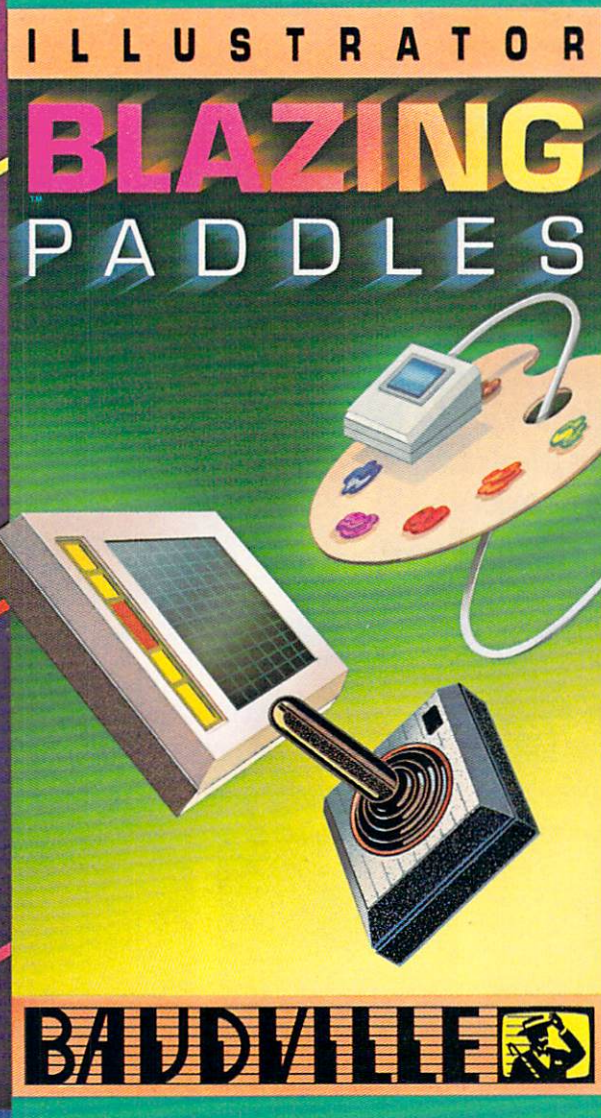
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FEATURES

31 BUYER'S GUIDE TO COMPUTERS

by Joe Gelman

Buying a new computer? Deciding on your purchase is a matter of matching your wants and needs with a machine. Our reviews of Apple, Atari, Commodore, IBM, and Tandy/Radio Shack computers will help you make the best decision.

37 WANDER INTO WONDERLAND

by Shay Addams

Adventure games take you on a vacation to a place as vivid as your imagination. Inside, we lead the way.

PLUS: AN INTERVIEW WITH HITCHHIKER'S DOUG ADAMS

42 HOW TO MAKE YOUR MOVE GO SMOOTHLY—WITH A COMPUTER

by Tan A. Summers

Some tips on planning and making your move to a new home (and . . . how to move your computer).

46 UPGRADING

by Robin Raskin

Experienced users are buying second computers—with more memory, more software, and more speed. Find out why.

PROGRAMMING

49 THE PROGRAMMER

Original programs for ADAM, Apple II series, Atari, C 64 & VIC-20, IBM PC & PCjr, and TRS-80 CoCo & Models III and 4.

50 TIPS TO THE TYPIST

51 BEGINNER PROGRAM

No need for a carrier pigeon. Send your notes soaring through the skies with *Airplane Message*.

54 GRAPHICS PROGRAM

Embroider your screen with *Patterns*.

57 PUZZLE

Planet of the Eggs: Use this program to save the Nezods from destruction—and discover a second program hidden in the first.

K-POWER

65 Advice for the Entrepreneur

Five ways to make money with your computer.

67 Dr. Cursor's Klinik

RAM disk; tracks and sectors, explained.

68 Game Strategy

Tips, tricks, and hints.

70 Microtones

Original music programs and a look at a new music product.

72 Compucopia

Little programs that do big things.

72 Contest

Can hackers be poets? Tell us what you think and win software.

PRODUCTS

73 WHAT'S IN STORE

73 SOFTWARE GUIDE AND REVIEWS

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DEPARTMENTS

4 EDITOR'S NOTE

6 BEHIND THE SCREENS

On-line trading, computerized comics, and hi-tech parties.

8 HOME-SCHOOL CONNECTION

by Mindy Pantiel and Becky Petersen

How software helps kids master the written word.

14 HOME/MONEY MANAGEMENT

by Kimball J. Beasley

Considering a major purchase? Should you borrow or use your savings? Use your computer and our original program to help you decide.

18 TELECOMPUTING

by Joe Gelman

Troubleshooting: How to avoid the hassles of telecomputing.

PLUS: RULES FOR MOVIE MAKER ANIMATION CONTEST (\$1,500 IN PRIZES!)

22 GAMES

by James Delson

Games with legs: How to find a game with long-run fun.

24 COMPUTING CLINIC

86 CLASSIFIED

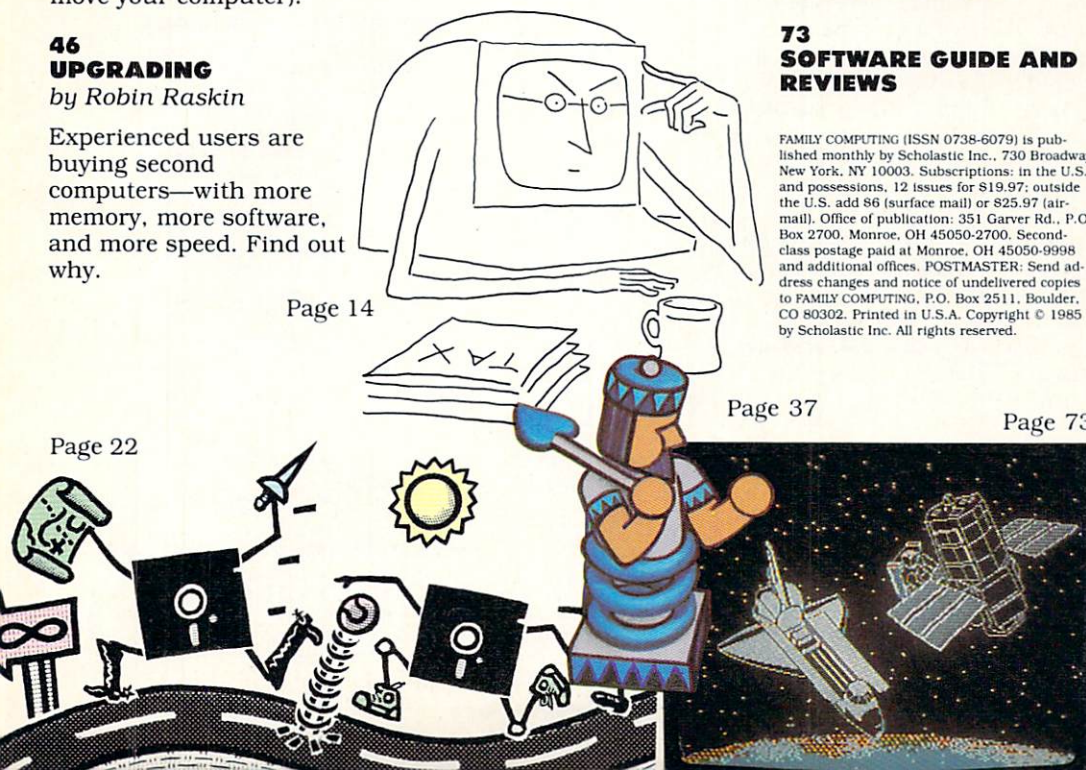
88 ADVERTISERS' INDEX

Page 14

Page 37

Page 73

Page 22



EDITOR'S NOTE

FOR A CHANGE...

Exactly two years ago we compiled our first Buyer's Guide to Computers for the premier issue of FAMILY COMPUTING. We'd learned that the most pressing question on the minds of prospective readers was "What computer should we buy?" Our guide would help to answer that question.

Now, our Buyer's Guides to Computers are one of the magazine's most popular features. It's a favorite of both those thinking about buying their first computer, and experienced owners.

But now, added to the questions about the power of the machine, software availability, and value, loom questions about the future, or staying-power, of each computer brand.

None of us foresaw the extent of the upheaval that would, before long, set upon the computer industry, especially the home segment. From the very start, we resisted using the term "home computer," sticking to our commitment to cover the wide range of computers that were being adopted for home use. We also believed that increased sophistication on the part of computer owners would lead to the use of more powerful machines.

But while we talked about the fact that the world of computing was just emerging, and that we were part of a phenomenon still in its infancy, we forgot what that would inevitably mean. We lost sight of the implications of growth and change. Not many of us gave much thought to the fact that some computer brands would disappear, that others would become standards for at least a period of time, and that leadership in the industry would revolve.

As a result of these changes, we have had to alter our plans as well. We can no longer cover all the machines that are no longer in production. For example, in order to run machine-specific programs for a computer, advertising revenue is required to help pay the enormous costs of translations, printing, and

paper needed for those programs. Arriving at this decision was a long and painful process.

As many readers noticed, starting with the April issue, we were no longer able to run programs for Timex computers; we've also reduced the number of programs running for the TI-99/4A. From time to time, we will run articles on modifying programs for various computer brands. We hope that many of our general articles, which do not depend on brand, still will help all computer owners.

Everything about the computer industry is fast-moving, which isn't always to the immediate benefit of the consumer. But changes in brand dominance always have been part of technology. My father always longed for and dreamt about the splendors of a Packard automobile he owned in the 1930s; we were still watching TV on the Stromberg-Carlson television set we had bought in the 1950s after it was no longer manufactured; and some people still call their VHS VCRs Betamaxes, since it was Sony's technology that prevailed when the industry was forming, and for some, the name just stuck, along with the phenomenon.

Computing's going to stick, too. And that's in the home as well as in school and at the office. And all of us pioneers will be glad we were among the first to take a chance on the technology that, more than any other, can revolutionize our lives. We'll keep publishing our Buyer's Guides, software and hardware reviews and features, and shopping tips to help you keep up to date.

I don't know about you, but I'll never go back to writing these notes on a typewriter, and I'm not one to yearn for the days when I sat staring at a blank page on my legal pad. I'll stick with the computer.

Claudia Cohl

CLAUDIA COHL
EDITOR-IN-CHIEF

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730 Broadway, New York, NY 10003
(212) 505-3580

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EDITORIAL

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MANAGING EDITOR: June Rogoznica

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CONTRIBUTING EDITORS: Jeffrey Bairstow,
James Delson, Peter Favaro Ph.D., Charles H.
Gajewy, Sarah Kortum, Tony Morris, Mindy
Pantiel, Becky Petersen, Robin Raskin

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DESIGN ASSISTANTS:
Doreen Maddox, Susan Taylor, Stephen E. Wilcox

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Chen, Joe Gelman

TECHNICAL ASSISTANTS: Maureen Bruno,
Shaun Codner, Susan Easum,
Kwong Lee, Ken Meyer

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BUSINESS MANAGER: Steven Abramowitz

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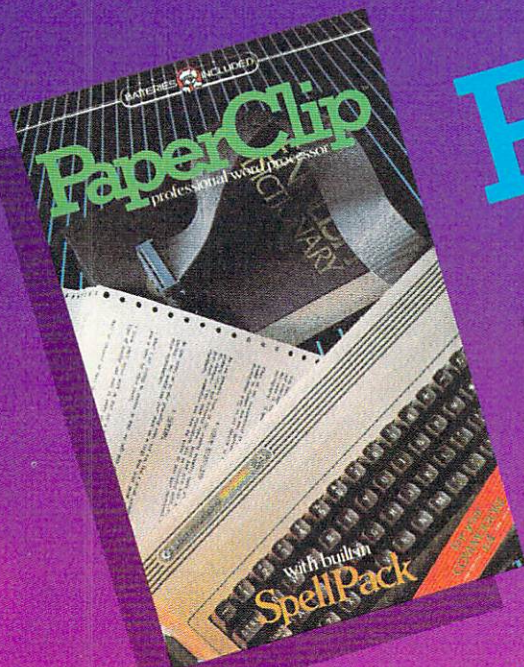
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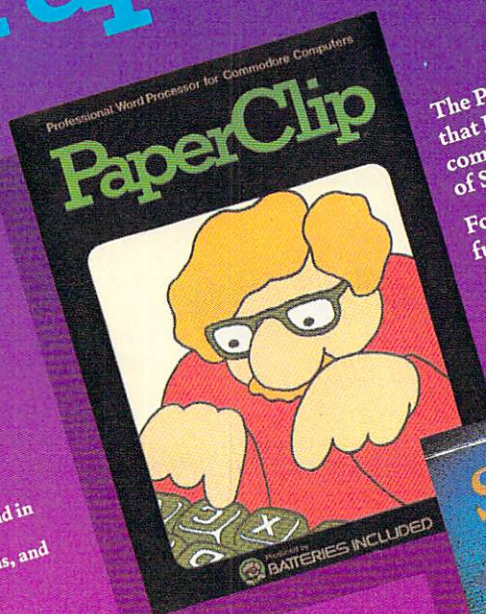
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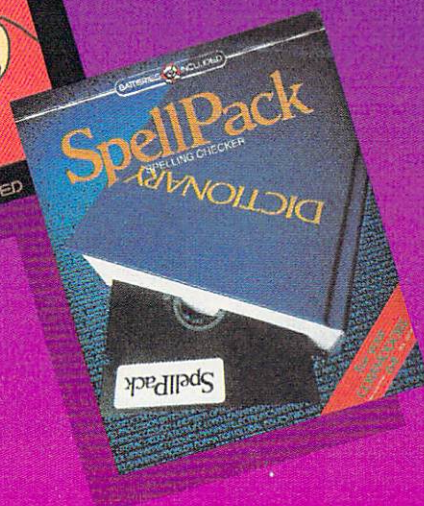
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BEHIND THE SCREENS

PEOPLE, NEWS, AND TRENDS

EDITED BY JUNE ROGOZNICA

Trading On-Line

You just received a hot tip from a friend who's a financial wizard: Sell your pork bellies and buy Gourmet Dog Food stocks. But, it's Saturday and your broker's office is closed. At this rate, you'll never make the Forbes 400 Richest People in America list before the age of 40.

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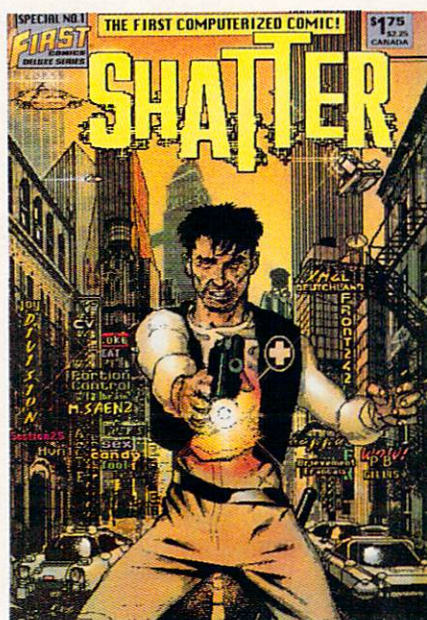
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Gadzooks! A Computerized Comic

The comics have always been a medium quick to reflect changes in society, so we knew it wouldn't be long before computers found their way



Shatter fighting for peace in Daley City.

into the funny pages. The graphic magic of Apple's Macintosh and the talents of First Comics, Inc.'s Michael Saenz and Peter Gillis have been combined to bring us *SHATTER*—the world's "first computerized comic."

Working from dialog that Gillis composes on an Apple III, Saenz draws and letters each panel of *SHATTER* using *MacPaint*, then colors the hi-res, black-and-white printouts by hand. *SHATTER*'s panels are richly textured and shaded, emphasizing the jagged, "computery" quality of Mac art.

The strip chronicles the adventures of one Sadr al-din Morales (aka "Shatter"), soldier of fortune and part-time detective, as he patrols the blitzed-out, megacorporate nightmare of 21st-century Daley City (Chicago), fighting for peace, profit, and an occasional glass of Coca-Cola. *SHATTER*'s metropolis is reminiscent of the Los Angeles portrayed in *Blade Runner*. It's a place of aimless violence and dark intrigue, served by a technology gone wild.

After the special premier issue, *SHATTER* will temporarily become a monthly feature in the First Comics series, *Jon Sable, Freelance*. According to editor Mike Gold, *SHATTER* will return in fall '85 as a full-length book. For more information, write First Comics, Inc., 1014 Davis St., Evanston, IL 60201.

—JOHN JAINSCHIGG

Hi-Tech Tupperware Parties

It was a long time coming, but the Tupperware party concept finally has entered the technology age.

Computer-training parties, it seems, are now the rage, with information storers replacing food storage containers. The computer parties are the brainchild of Linda Cooper and Laurel Gruenwald, the cofounders of Interpersonal Software in Manhattan. "We teach women how to be comfortable with the computer. We teach them to use the computer like an appliance," explains Cooper.

Though the subject matter differs from the traditional Tupperware party, the setting is the same: the home. Cooper and Gruenwald rely on hostesses who invite interested friends into their homes for the two-hour training sessions at a cost of \$40 per person. The hostess receives a 10 percent discount for each person who attends the party.

Interpersonal Software's instructors start with the basics: dealing with computerphobia, getting the



In-home demonstrations: complete with cookies, coffee, and computers.

computer system set up, using a word processor and data base, etc. To be sure, the company's in-home, low-key learning environment has been a success, drawing more than 1,000 customers over the past year. The women in the groups usually are between 25 and 55 years old.

Interest continues to grow. "I've been getting phone calls from people in Alaska who've heard about our approach," says Cooper. ☐

Announcing: Computer Diet.™

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This is a new, powerful, revolutionary program – springing from nutritional and medical science and grounded in human psychology – that creates an individualized, personalized program to help you look and feel better for the rest of your life.

This software – designed and written by the physicians and medical specialists above – goes far beyond any “diet book”. It means you don’t have to “go it alone” or rely on will power to slim down and stay slimmer and healthier. While it’s complete, it isn’t formidable or threatening; it’s easy and enjoyable to use, at home or on your office computer.

First, it takes into consideration your physical fitness, weight history and eating habits as well as your attitudes and feelings about weight control.

Working with these factors, you and your Original Boston Computer Diet counselor create personalized, easy-to-do, easy-to-follow meal plans that are specifically tailored to your needs. You can actually choose one of three computer counselors, the one whose personality best meshes with yours, to aid you, to supervise your diet and help you progress.

Rather than relying on will power, The Original Boston

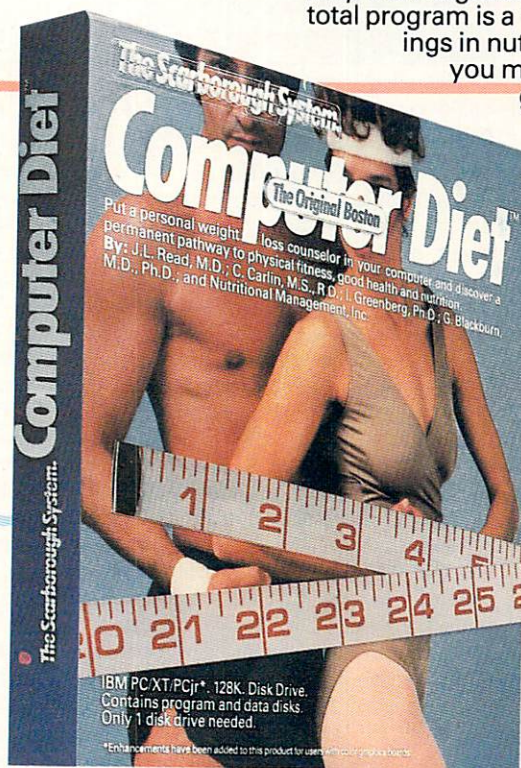
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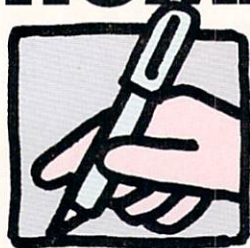
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HOME-SCHOOL CONNECTION



MASTERING THE WRITTEN WORD

Software to Improve Your Child's Writing Skills

BY BECKY PETERSEN
AND MINDY PANTIEL

ISSUE	TOPIC
April	Introducing skill-building software
May	Software for reading skills
June	Software for writing skills
July	Software for math skills

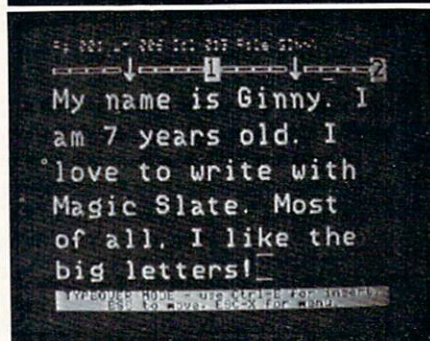
This is the third in a four-part series about software to help your child with basic skills. This month, we discuss how the computer can help improve your child's writing.

Remember the compositions describing summer vacations gone by? The book reports and stories read aloud to the rest of the class, and maybe submitted to the school literary magazine? Teachers always have encouraged writing practice because that's what it takes to make students comfortable with the process.

Many educators are finding that computers, coupled with the right software, can help hone students' writing skills. Word-processing packages and a breed of software known as story generators are a mainstay of writing instruction in many classrooms. And parents, armed with both an understanding of the steps involved in learning to write well and a sense of what software is available, are taking advantage of this technology at home to help their kids master this invaluable skill.

Michelle Small, an English teacher in Boulder, Colorado, has had tremendous success with the computer as a writing tool in both the home and school settings. At school, Small claims, "Thanks to word processing, I get more polished work than anything students ever did by hand." She also reports improved attendance. "No one ever misses computer-lab class, and kids who have trouble remembering a pencil never forget their disk."

On the home front, Michelle's 8-year-old son, Jason, uses a word-processing program called *Bank*



KidWriter (top), a story generator, gives kids a place to start. Magic Slate (bottom) uses big letters to soften the first steps of writing.

Street Writer (Broderbund). Using it is a lot "neater" than writing by hand, he says (and he doesn't mean cleaner, although it is that, too). Jason's taken to letter-writing and turning out fanciful dialogs on the computer as well.

The methods teachers use to turn students into effective writers have changed considerably over the past few decades. Teachers no longer assign a theme, collect the papers, and return them days later with a grade. Today, it's far more usual for teachers to interact with students *throughout* the writing process, playing the part of a coach, offering cues and encouragement, making suggestions, and asking questions similar to those the kids must learn to ask (and answer) themselves.

Driven by the right kind of software, computers can help out in these coaching tasks. Below, we've taken the topic apart. First we examine the problems kids face as they learn to write. Next, we show how the computer and software can help. Finally, we provide titles that come with high marks from language arts teachers looking at software with home use in mind.

PROBLEM: GETTING AN IDEA TRY: STORY GENERATORS

The more kids write, the better they write. But with many kids, especially in the younger grades, a blank piece of paper or a blank screen is a big obstacle to overcome. Where to begin?

Computerized story generators might help. Appropriate for all ages, they are designed to motivate young writers. Another useful type of program is the story tree, which can assist students of any age in writing with clarity and organization.

Some story generators are a cross between a graphics package and a word processor. They give early writers a number of tools to use to fill up that blank page. Often furnished with a bank of preprogrammed images, like computerized Colorforms, they give kids a concrete place to start when putting their ideas together. "Programs that use graphics and color are exciting and motivational for children," says Al Suttles, a teacher of computers and writing at Columbia University Teachers College.

Story generators can also help children who are just beginning to write complete sentences. Our experience shows that parents can join in by first encouraging their kids to draw a scene and then having the young "authors" dictate the story they have in mind. This is a fun activity that gives kids a better understanding of writing concepts.

Suttles likes programs in which the child's imagination can be in the driver's seat. He recommends packages that go easy on prompts and reminders, and let a child create freely. Some kids, however, may need more direction and structure in their writing efforts. For them, pictures and color aren't a crucial factor. What they need is a package that guides them step-by-step through the stages of plot or theme development.

Recommendations:

KIDWRITER (Spinnaker, for Apple II series, Atari Home Computers, C 64,

Contributing Editors BECKY PETERSEN and MINDY PANTIEL have written extensively about computers, kids, and learning.

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IBM PC/PCjr; \$26.95–\$29.95). With this package, kids choose a background, and paste one of 64 pictures onto the screen. An elementary word processor allows them to create, edit, and save a story that explains or enhances the picture. Unfortunately, you cannot print out your creations.

STORY MAKER: A FACT AND FICTION TOOL KIT (Scholastic, for Apple II series; \$39.95). Kids not only can "stick" predrawn pictures onto the computer page, they can draw freehand, add text in different typefaces, and print their stories out to create their very own books.

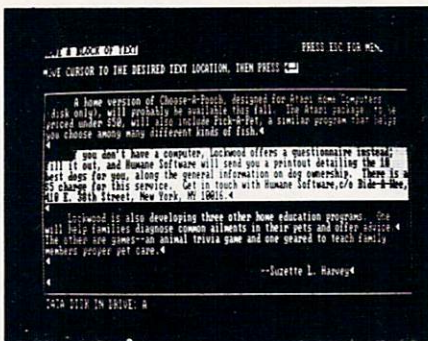
STORY TREE (Scholastic, for Apple II series, IBM PC/PCjr; \$39.95). This is a fine choice for kids who need to work on organizing their thoughts. "It's less of a writing program than it is an idea organizer," reports Gwen Solomon, a high-school English teacher and former computer specialist with the New York City Board of Education. The package provides some sample "branching stories," i.e. plots or descriptions that proceed in different directions with varying outcomes depending on choices made by the reader. Students can create their own stories, page by page, and include questions that lead the reader into the different branches of the plot. Solomon recommends this package for use with older children. "As they define pages, write passages, and decide on the direction of the following text," explains Solomon "they'll be thinking about main ideas, transitions, and the structure of the whole story." These concepts are important for improving all kinds of writing.

PROBLEM: REWRITING TRY: WORD PROCESSORS

Good writing is not just a matter of getting ideas down on paper. Once kids have begun to write, rewriting is the next crucial step. Learning how to write requires learning how to revise.

That's where the word processor comes to the rescue. Bette Wayne is a Lafayette, Colorado, high-school English and computer-science teacher who knows, all too well, the necessity of rewriting to develop a good finished product. She also knows how tough it is to get kids to do it.

Word processing does away with the hand-cramping agony associated with rewriting papers. "With the computer making it easier to move



Bank Street Writer, one of the top-selling packages available, brings out the closet wordsmith in all of us.

things around, children are more willing to sit down and write rough drafts. They can do more revising than they would normally," explains Linda Leonard Lamme, a professor of education at the University of Florida, and author of *Growing Up Writing*, a book about literacy skills.

"I do all of my written assignments at home using a word processor," reports Mike Cooper, a Longmont, Colorado, high-school senior. Afflicted with a typical case of chicken-scratch, Mike says, "Considering my handwriting is so bad, the word processor is really helpful." Mike's parents purchased an Apple IIe two years ago primarily for their children's schoolwork, and a word-processing package was one of their first software investments. Mike's two younger sisters, ages 15 and 12, also have begun to write on the computer.

Mike's mother, Yvonne, has seen substantial improvement in her son's writing abilities. "He uses the computer every day," she reports. "And because of word processing, he'll sit down and write things he never would have done in longhand."

Recommendations:

BANK STREET WRITER (Broderbund, for Apple II series, Atari Home Computers, C 64, IBM PC/PCjr; \$69.95–\$79.95). Different operations are reached by using cursor keys to move through a menu of options in this easy-to-use package. A new, improved version for the IBM PC and Apple IIc provides a number of extra features such as underlining, and yet is easy enough for most kids and beginners.

HOMEWORD (Sierra, for Apple II series, Atari, C 64, IBM PC/PCjr from IBM); \$49.95–\$69.95). With its use of icons or pictures to illustrate the various word-processing functions—such as SAVE, STORE, and PRINT—this package is a good bet.

PFS: WRITE (Software Publishing, for Apple II series, C 64; \$99–\$125). Older kids (high-school level) will be able to handle this more powerful package. It's tougher to use, but it also introduces students to more advanced word-processing capabilities: the ability to justify the right-hand margin, and center text such as titles or subheads.

MAGIC SLATE (Sunburst Communications, for Apple II series; \$89.95). This is a package that's pulled its weight in a number of classrooms. Its 20-column mode prints out large type on the screen or on the printer—making it a package for younger writers or learning-disabled children. If kids have mastered the early stages, they can use the package's 40- or 80-column formats (with the proper hardware), which process text at normal sizes. The home version contains an appendix describing the numerous activities and applications possible.

WORDSTAR (MicroPro International, for Apple II series, IBM PC/PCjr; \$350). This is a powerful package with features not every family will need. Despite its professional scale, however, it's straightforward enough that your teens will be able to take advantage of it as well. Bette Wayne reports that her teenage students have used it with success.

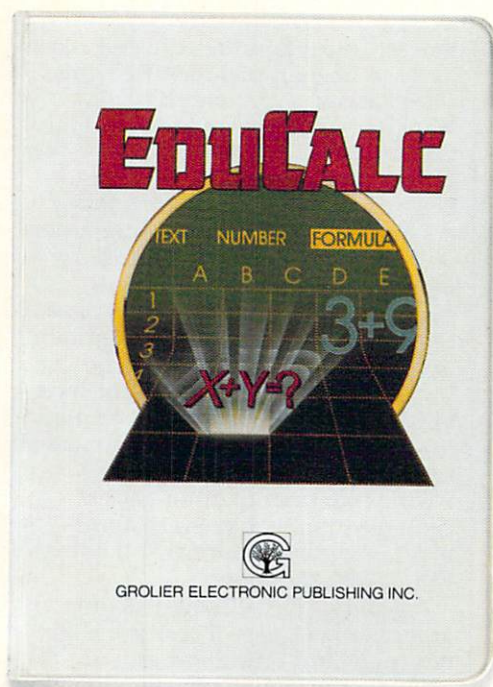
PROBLEM: GRAMMAR TRY: WORKBOOKS

Studying grammar used to be the way students learned when a sentence required a comma or a period. But over the past decade, the study of grammar has fallen on hard times. Teachers are focusing on context; kids learn grammar by practicing writing—seeing subject-verb agreement as it is relevant to the actual writing process, not just drilling it in a vacuum.

Still, for kids who have trouble grasping a particular concept, computerized workbook programs and straightforward drill-and-practice packages have helped out. Judi Hying, a California high-school teacher with 21 years of experience, is a firm believer in the value of the computer as a tool to help kids who are behind improve writing skills.

Hying maintains that kids automatically are drawn to the computer—eager to use it as a means to escape pencil and paper. Nevertheless, in the home, software has to have an element of fun—a motivational el-

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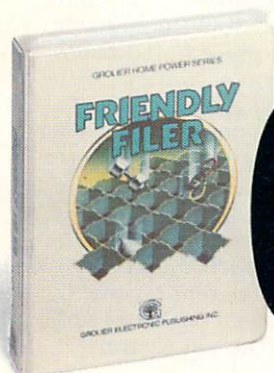
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ement. Unless it's a very unusual educational game, parents will have to exert some pressure if they want their kids to sit down and work with these packages.

Barbara Devir, a New York elementary-school teacher, encourages parents to get involved—to work through the programs with their kids, and then discuss them.

Recommendations:

HOMONYMS, SYNONYMS, and ROOTS/AFFIXES (Hartley, for Apple II series; \$39.95). These are multilesson packages that specialize in mastering vocabulary, which is crucial to good writing. In all programs, the word difficulty increases as students proceed through the lessons.

PIK-PEK-PUT (Data Command, for Apple II series, TRS-80 Models III/4; \$29 each in series of eight disks). Playing a modified game of tic-tac-toe, children familiarize themselves with suffixes, prefixes, base words, and contractions.

ARCADEMIC SKILL BUILDERS IN LANGUAGE ARTS (DLM Software, for Apple II series, Atari Home Computers, C 64, IBM PC/PCjr; \$34 each in series of six disks). Not many drill-and-practice packages can be used effectively at home, says Barbara Devir. They just can't hold their own against a host of other, more entertaining diversions, such as *PacMan* and Saturday-morning cartoons. But DLM's packages, crafted after arcade games, let "kids learn with a joystick," Devir says. *Word Invasion* and *Verb Viper* are two highly recommended packages that will help kids become comfortable with different types of speech while getting a good hand-eye coordination workout at the same time.

SENTENCE COMBINING (Milliken, for Apple II series; \$105). Sentence combining is a relatively new method for learning grammar. The names of parts of speech and the rules aren't as important as whether or not sentences are correct and how they are used. In this package, kids improve their command of sentence-writing by combining phrases provided on the screen. HENRY CAN'T PLAY THE PIANO TODAY might be combined with HE HAS A BROKEN FINGER and BECAUSE to create a full sentence. Solomon only recommends this program for use at home with extensive parental involvement. It's an effective package that attacks style problems such as short and choppy or incomplete sen-

tences. But it is rather dry and not likely to hold an unsupervised child.

THE GRAMMAR EXAMINER (DesignWare, for Apple II series, Atari Home Computers, C 64, IBM PC/PCjr; \$44). This is another package that would be good for the whole family. Players begin the game as a cub reporter on the staff of the *Grammar Examiner Newspaper*. Presented with multiple-choice grammar questions to answer, or error-laden paragraphs to correct, players who "edit" properly can work their way up to the level of editor-in-chief. Kids get a chance to practice skills in context, actually revising passages in the process, paying attention to punctuation, capitalization, subject-verb agreement, verb tense, adverb and adjective usage, and more.

A general word of advice about grammar packages: There are a lot out there, but only a few are fun enough to stimulate children at home. Avoid excessive arm-twisting, unless you want your computer to go the route of those hated piano lessons. Solomon says they can be used at home, but only under close parental supervision. Contact your child's instructor for help in determining where extra at-home help is needed. "If you've got kids you know have a writing problem, sit with them and work with them," she advises. "Then, after reinforcement, students should go back and apply the concepts to actual writing."

NO MAGIC SOLUTION

The computer won't transform your child into a master wordsmith, but in word processors and story-generators you have tools that eliminate many barriers to the smooth flow of ideas. And some skill-building software lets you focus on the areas your child needs to work on.

With the control in your hands and the hands of your children, you have the power to practice. And practice makes for, if not perfection, at least improvement. **E**

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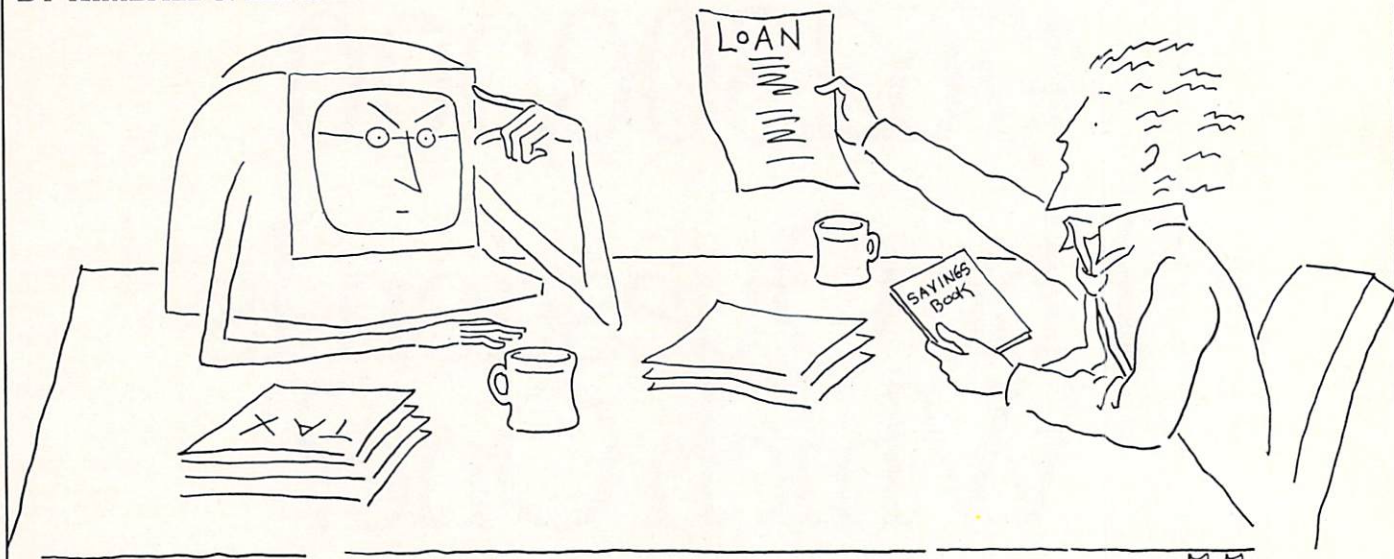
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FINANCIAL DECISION-MAKING

Considering a Major Purchase? Should You Borrow or Use Your Savings? Let Your Computer Decide.

BY KIMBALL J. BEASLEY



We've all had cash-flow problems at one time or another. Unfortunately, our funds are usually at their lowest when our needs are the greatest. So, when simultaneously faced with a shortage of cash and a major expense or purchase, we may have to borrow money. But borrowing, it seems, is usually the course of last resort.

Rarely do we consider that borrowing may make good financial sense—even when we have the cash available. Why? Because in some situations, the tax savings produced by your loan's interest may outweigh the interest you lose when you withdraw money from your interest-bearing account (whether it's from your savings, a money market account, or NOW account).

There are quite a few factors to consider before you make a major borrowing decision. Your computer and the accompanying program can help you evaluate the numerical information, whether you're deciding how to pay for college tuition or a new car. Certainly, these calculations can be performed using pencil

and paper, but the computer can save you time and costly mathematical errors.

THE COST ANALYZER

In short, the BASIC program we've provided is a cost analyzer. In this case, we're comparing the cost of lost savings interest vs. the overall cost of borrowing. No matter what you purchase, several key factors will not change: The cost of borrowing money equals the loan origination fee plus the periodic loan payments less the income tax deductions on interest paid.

Note, however, that our program does not allow for tax bracket creep. For instance, if you expect to move from the 30 percent to the 40 percent tax bracket during the life of the loan, you will have to plug in an average (in this case 35 percent). As you can see in the accompanying printouts, your tax bracket will affect your calculations and therefore may influence your decision to borrow. For example, if you expect to move into a higher tax bracket, the cost of borrowing will go down—perhaps enough to tip the balance in favor of the loan. On the other hand, if you plan to retire within the next few years, the tax benefits of taking out a loan may be drastically re-

duced since you will be moving into a lower tax bracket.

Clearly, there are certain monetary concerns that the computer will not be able to measure. For example, if you use your savings as a type of emergency fund, you may not want it depleted—at any cost. Peace of mind can be worth a lot. The value of having money liquid in savings may outweigh the purely numerical computer analysis that favors withdrawing savings.

THE COST OF MONEY

In order to use the program effectively, it's important to understand the "cost of money" concept. Since money in a savings account earns interest, removing the money from the account causes you to lose that interest. To illustrate how this concept works with our program, let's create a hypothetical situation. For example, you've decided to build a garage for your home, and the contractors want \$10,000 up front. If you withdraw \$10,000 from your money-market account, which earns 8 percent interest, you will lose \$800 in interest at the end of one year. If you're in the 50 percent tax bracket, that's a net cost to you of \$400.

Your second option is to borrow \$10,000 from the bank at say, a 15

KIMBALL J. BEASLEY is a senior engineer with a consulting firm in Princeton, New Jersey. He wrote the January Home/Money Management column, "Computing Your Financial Goals."

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HOME/MONEY MANAGEMENT

percent interest rate for one year. Of course, that costs you \$1,500 in interest, but your \$1,500 tax deduction reduces your taxes by \$750. In addition, you net \$400 on the \$10,000 you've left in your money-market account. The net cost to you of the loan is \$1,500 minus \$750 minus \$400, or \$350. That's \$50 less than using your own savings.

The Cost Analyzer assumes monthly payments and compounding, and reports the cost of the loan in today's dollars. In this example we've assumed simple interest on a one-year loan. The longer the term of the loan, the more tedious the calcu-

lations—and that's when your computer will be especially handy.

Factors such as the length of the loan, interest rates, and your specific tax bracket may drastically affect your decision whether to borrow or use savings. We've provided several sample printouts to illustrate the effect of these variables.

THE PERSONAL ADVISER

Next time you're ready to make a major investment or purchase, let your computer be part of your financial decision-making. First, sit down with your computer and the pro-

gram on the next page, plug in some numbers, and experiment. Once you're comfortable with the machine's number-crunching abilities, you can turn it into a sort of personal accountant. Like an accountant, it will provide you with the right numbers and let you make the final decision. And the best part—you won't have to pay a \$100-an-hour bill at the end of the session.

This article and program are not meant to serve as advice, but rather, as guidelines to aid you in making financial decisions. It's best to consult a tax attorney or accountant before you make any major financial decision. [E]

ORIGINAL ANALYSIS

INTEREST ON SAVINGS = 8 %
INTEREST AFTER TAX = 8 %
AMOUNT OF LOAN = \$10000.00
LOAN INTEREST RATE = 12.5 %
DEDUCTIBLE LOAN FEE = \$150.00
NOT HOME LOAN
LOAN TERM IS 10 YEARS
YOUR TAX BRACKET = 40 %
MONTHLY LOAN PAYMENT = \$146.37

YEAR	INTEREST PAYMENT	PRINCIPAL PAYMENT	END-OF-YEAR BALANCE	NET TAX BENEFIT
1	\$1219.94	\$536.56	\$9463.43	\$493.97
2	\$1148.89	\$607.61	\$8855.82	\$465.55
3	\$1068.44	\$688.07	\$8167.74	\$433.37
4	\$977.32	\$779.18	\$7388.56	\$396.93
5	\$874.15	\$882.36	\$6506.20	\$355.66
6	\$757.31	\$999.19	\$5507.00	\$308.92
7	\$625.00	\$1131.50	\$4375.49	\$256.00
8	\$475.17	\$1281.33	\$3094.15	\$196.06
9	\$305.50	\$1451.00	\$1643.14	\$128.20
10	\$113.36	\$1643.14	\$0.00	\$51.34

IN TODAY'S DOLLARS,

USING SAVINGS COSTS YOU \$10000.00
BORROWING THE MONEY COSTS YOU \$9879.39*

*IBM: \$9888.40 Models III & 4: \$9879.49

EFFECT OF HIGHER INTEREST RATE

INTEREST ON SAVINGS = 8 %
INTEREST AFTER TAX = 8 %
AMOUNT OF LOAN = \$10000.00
LOAN INTEREST RATE = 14 %
DEDUCTIBLE LOAN FEE = \$150.00
NOT HOME LOAN
LOAN TERM IS 10 YEARS
YOUR TAX BRACKET = 40 %
MONTHLY LOAN PAYMENT = \$155.26

YEAR	INTEREST PAYMENT	PRINCIPAL PAYMENT	END-OF-YEAR BALANCE	NET TAX BENEFIT
1	\$1369.09	\$494.10	\$9505.89	\$553.63
2	\$1295.30	\$567.89	\$8937.99	\$524.12
3	\$1210.48	\$652.70	\$8285.29	\$490.19
4	\$1113.01	\$750.18	\$7535.10	\$451.20
5	\$1000.97	\$862.21	\$6672.88	\$406.39
6	\$872.21	\$990.98	\$5681.90	\$354.88
7	\$724.21	\$1138.97	\$4542.92	\$295.68
8	\$554.12	\$1309.07	\$3233.84	\$227.64
9	\$358.62	\$1504.57	\$1729.27	\$149.44
10	\$133.92	\$1729.27	\$0.00	\$59.56

IN TODAY'S DOLLARS,

USING SAVINGS COSTS YOU \$10000.00
BORROWING THE MONEY COSTS YOU \$10295.27*

*IBM: \$10,295.28 Models III & 4: \$10,295.43

EFFECT OF LOWER TAX BRACKET

INTEREST ON SAVINGS = 8 %
INTEREST AFTER TAX = 8 %
AMOUNT OF LOAN = \$10000.00
LOAN INTEREST RATE = 12.5 %
DEDUCTIBLE LOAN FEE = \$150.00
NOT HOME LOAN
LOAN TERM IS 10 YEARS
YOUR TAX BRACKET = 30 %
MONTHLY LOAN PAYMENT = \$146.37

YEAR	INTEREST PAYMENT	PRINCIPAL PAYMENT	END-OF-YEAR BALANCE	NET TAX BENEFIT
1	\$1219.94	\$536.56	\$9463.43	\$370.48
2	\$1148.89	\$607.61	\$8855.82	\$349.16
3	\$1068.44	\$688.07	\$8167.74	\$325.03
4	\$977.32	\$779.18	\$7388.56	\$297.69
5	\$874.15	\$882.36	\$6506.20	\$266.74
6	\$757.31	\$999.19	\$5507.00	\$231.69
7	\$625.00	\$1131.50	\$4375.49	\$192.00
8	\$475.17	\$1281.33	\$3094.15	\$147.05
9	\$305.50	\$1451.00	\$1643.14	\$96.15
10	\$113.36	\$1643.14	\$0.00	\$38.51

IN TODAY'S DOLLARS,

USING SAVINGS COSTS YOU \$10000.00
BORROWING THE MONEY COSTS YOU \$10463.18*

*IBM: \$10,463.18 Models III & 4: \$10,463.27

EFFECT OF SHORTER LOAN TERM

INTEREST ON SAVINGS = 8 %
INTEREST AFTER TAX = 8 %
AMOUNT OF LOAN = \$10000.00
LOAN INTEREST RATE = 12.5 %
DEDUCTIBLE LOAN FEE = \$150.00
NOT HOME LOAN
LOAN TERM IS 3 YEARS
YOUR TAX BRACKET = 40 %
MONTHLY LOAN PAYMENT = \$334.53

YEAR	INTEREST PAYMENT	PRINCIPAL PAYMENT	END-OF-YEAR BALANCE	NET TAX BENEFIT
1	\$1085.99	\$2928.44	\$7071.55	\$454.39
2	\$698.21	\$3316.21	\$3755.33	\$299.28
3	\$259.09	\$3755.33	\$0.00	\$123.63

IN TODAY'S DOLLARS,

USING SAVINGS COSTS YOU \$10000.00
BORROWING THE MONEY COSTS YOU \$10021.74*

*IBM: \$10,021.74 Models III & 4: \$10,021.83

Quite a few variables can affect your decision to borrow money, as the printouts above show. However, there are factors that our program does not take into account. High inflation, for example, can increase the benefits of borrowing.

*Note: Due to minor differences among machines, the IBM and TRS-80 Models III & 4 versions produce slightly different results. So that you can verify that your program is working correctly, we've shown how much BORROWING THE MONEY COSTS YOU for these two computers.

Program Notes: When you run *The Cost Analyzer*, if you're not sure of the loan fees, enter zero or estimate the answer. It's easy to run the program over and over again with different numbers. *The Cost Analyzer* assumes that you will itemize deductions on your federal income-tax return, and treats the purchase as if it were made on the first day of the year. A "home loan" is a loan for the purpose of buying or improving your principal residence. There are three kinds of loan fees or "points": 1. Nondeductible fee (no tax deduction allowed); 2. Deductible fee on a home loan (deduction in first year); 3. Deductible fee on other loans (deduction spread over term of loan). Check the status of the fees on your loan with your accountant or loan officer.

Base Version (Commodore 64 w/printer) *The Cost Analyzer*

```

10 SP$=CHR$(32):FOR Z=2 TO 11:SP$=SP$+CHR$(32):NEXT Z
20 PRINT CHR$(147);
30 PRINT "THE COST ANALYZER":PRINT
40 INPUT "INTEREST RATE ON SAVINGS (%):";T
50 IRS=T/100:PRINT
60 TS="":PRINT "IS INTEREST ON SAVINGS TAXABLE?";INPUT
TS:PRINT
70 IF TS="" THEN 60
80 TXBL=(LEFT$(TS,1)="Y")
90 INPUT "AMOUNT OF LOAN ($)";LN:PRINT
100 INPUT "LOAN INTEREST RATE (%)";T:LIR=T/100:PRINT
110 INPUT "NONDEDUCTIBLE LOAN FEE ($)";NLF:PRINT
120 INPUT "DEDUCTIBLE LOAN FEE ($)";DLF:PRINT
130 IF DLF=0 THEN 160
140 TS="":PRINT "IS THIS A HOME LOAN?";INPUT TS:IF TS=
"" THEN 140
150 HOM=(LEFT$(TS,1)="Y"):PRINT
160 INPUT "LOAN TERM (NO. OF YEARS)";YRS:PRINT
170 INPUT "YOUR TAX BRACKET (%)";T:TBR=T/100:PRINT
180 FLG=-1:MIR=LIR/12:ADTR=IRS*(1-TBR*(-TXBL))
190 PCST=NLF+DLF
200 MP=LN*MIR*(1+MIR)^(YRS*12)/((1+MIR)^(YRS*12)-1)
210 PRINT "PREPARE PRINTER AND":PRINT "PRESS ANY KEY."
220 GET K$:IF K$="" THEN 220
230 PRINT CHR$(147);:OPEN 4,4
240 PRINT#4,"THE COST ANALYZER":PRINT#4
250 PRINT#4,"INTEREST ON SAVINGS      = ";IRS*100;"%"
260 PRINT#4," INTEREST AFTER TAX      = ";ADTR*100;"%"
270 PRINT#4,"AMOUNT OF LOAN          = ";
280 T=LN:GOSUB 1000
290 PRINT#4,"LOAN INTEREST RATE      = ";LIR*100;"%"
300 IF NLF THEN PRINT#4,"NONDEDUCTIBLE LOAN FEE = ";
310 IF NLF THEN T=NLF:GOSUB 1000
320 IF DLF=0 THEN 370
330 PRINT#4,"DEDUCTIBLE LOAN FEE      = ";
340 T=DLF:GOSUB 1000
350 IF NOT HOM THEN PRINT#4," **NOT HOME LOAN**"
360 IF HOM THEN PRINT#4," **HOME LOAN**"
370 PRINT#4,"LOAN TERM IS";YRS;"YEARS"
380 PRINT#4,"YOUR TAX BRACKET      = ";TBR*100;"%"
390 PRINT#4:PRINT#4,"MONTHLY LOAN PAYMENT = ";
400 T=MP:GOSUB 1000:PRINT#4
410 PRINT#4,LEFT$(SP$,8);"INTEREST      PRINCIPAL      E
ND-OF-YEAR      NET TAX"
420 PRINT#4,"YEAR      PAYMENT      PAYMENT      BALA
NCE      BENEFIT"
430 PRINT#4,"-----
-----
-----"
440 BAL=LN:FLG=0
450 FOR ZY=1 TO YRS:YPP=0:YIP=0:YTB=0
460 FOR ZM=1 TO 12
470 IP=BAL*MIR:PP=MP-IP:BPAL=BAL-PP:NTB=IP*TBR
480 IF ZY=1 AND HOM THEN NTB=NTB+DLF*TBR/12
490 IF DLF AND NOT HOM THEN NTB=NTB+(DLF*TBR)/(12*YRS)
500 PCST=PCST+(MP-NTB)/(1+ADTR/12)^(ZY-1)*12+ZM)
510 YPP=YPP+PP:YIP=YIP+IP:YTB=YTB+NTB
520 NEXT ZM
530 IF ZY<10 THEN PRINT#4," ";
540 PRINT#4,ZY;:T=YIP:GOSUB 1000:T=YPP:GOSUB 1000
550 T=BAL:GOSUB 1000:T=YTB:GOSUB 1000:PRINT#4
560 NEXT ZY:FLG=-1

```

```

570 PRINT#4:PRINT#4,"IN TODAY'S DOLLARS,":PRINT#4
580 PRINT#4," USING SAVINGS COSTS YOU      ";
590 T=LN:GOSUB 1000
600 PRINT#4," BORROWING THE MONEY COSTS YOU ";
610 T=PCST:GOSUB 1000
620 PRINT#4:CLOSE 4
630 TS="":PRINT "DO YOU WANT ANOTHER ANALYSIS?";INPUT
TS
640 IF TS="" THEN 630
650 IF LEFT$(TS,1)="Y" THEN 20
660 END
1000 TS=STR$(INT((ABS(T)+1)*100))
1010 CNS=RIGHT$(TS,2)
1020 TS=STR$(VAL(LEFT$(TS,LEN(TS)-2))-1)
1030 PF$="$"+RIGHT$(TS,LEN(TS)-1)+"."+CNS
1040 IF FLG THEN PRINT#4,PF$:RETURN
1050 PRINT#4,LEFT$(SP$,14-LEN(PF$));PF$;:RETURN

```

MODIFICATIONS FOR OTHER COMPUTERS

ADAM & Apple w/printer

Use the base version, with the following alterations:
Change PRINT#4 (or PRINT#4,) to PRINT in lines 240-270, 290-300, 330, 350-360, 380-430, 530, 550, 570-580, 600, and 1040-1050. Also, change lines 20, 180, 220, 230, 370, 540, 560, 620, and 1030 to read as follows:

```

20 HOME
180 FLG=1:MIR=LIR/12:ADTR=IRS*(1-TBR*TXBL)
220 GET K$
230 HOME:PRINT:PRINT CHR$(4);"PR# 1"
370 PRINT "LOAN TERM IS ";YRS;" YEARS"
540 PRINT " ";ZY;" ";:T=YIP:GOSUB 1000:T=YPP:GOSUB 1000
560 NEXT ZY:FLG=1
620 PRINT CHR$(4);"PR# 0"
1030 PF$="$"+TS+"."+CNS

```

IBM PC & PCjr w/printer

Use the base version, with the following alterations:
Omit lines 530, 620, and 1030-1050. Change PRINT#4 (or PRINT#4,) to LPRINT in lines 240-270, 290-300, 330, 350-430, 550, 570-580, and 600. Finally, change lines 10-20, 220-230, 540, and 1000-1020 to read as follows:

```

10 DEFDBL A-Y:SP$=STRING$(11,32)
20 CLS
220 IF INKEY$="" THEN 220
230 CLS
540 LPRINT USING "### ";ZY;:T=YIP:GOSUB 1000:T=YPP:GOS
UB 1000
1000 IF FLG THEN ND=LEN(STR$(INT(T)))-2 ELSE ND=9
1010 LPRINT USING "$$"+STRING$(ND,"#")+".##";T;
1020 IF FLG THEN LPRINT:RETURN ELSE RETURN

```

TRS-80 Color Computer w/printer

Use the base version, with the following alterations:
Omit line 620. Change PRINT#4 to PRINT#-2 in lines 240-270, 290-300, 330, 350-430, 530-550, 570-580, 600, and 1040-1050. Finally, change lines 20 and 220-230 to read as follows:

```

20 CLS
220 IF INKEY$="" THEN 220
230 CLS

```

TRS-80 Models III & 4 w/printer

Use the modifications given above for the IBM PC and PCjr. Note: Use the up-arrow (^) key (upper left-hand corner of the keyboard) to enter the ^ character in lines 200 and 500. This character will look like a left bracket ([) on the screen, but will show up as a ^ on most printers.

TELECOMPUTING

TROUBLESHOOTING

How to Avoid the Hassles of Telecomputing

BY JOE GELMAN

Telecommunicating can be loads of fun, and yet incredibly frustrating at times. Other computers will hang up on you, tell you you're not authorized to access a system (when you *know* you are), show you strange and meaningless characters, and otherwise harass you. Such are the perils of modern technology. The good news? You can keep those annoyances to a minimum.

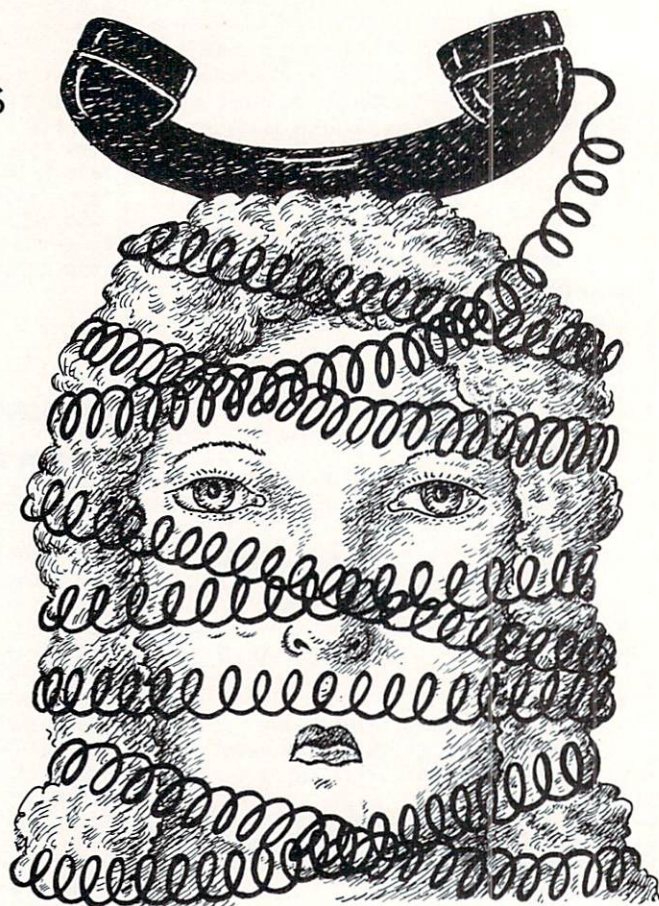
Our March Buyer's Guide discussed modems and communications software, the basic ingredients for telecommunicating. April's Telecomputing column dealt with setting up and making your first successful call with a modem. But what do you do when things don't go just right? There are two options. The coward's way out is to turn off your computer and lie down. Or you can do some troubleshooting and get rid of the problem. Not surprisingly, we favor the second approach.

A communications problem will generally fall into one of three categories. Your fault, their fault, or the phone company's fault. The easiest situation to deal with is when *you're* doing something wrong because you can usually identify the problem and fix it. When the other party or the phone line is the source of difficulty, you have fewer options.

CORRECT SETTINGS

Before making a call, you should set up your modem and terminal software parameters to complement those of the system you want to reach. If you own a dual-speed modem (300/1200 baud), select the proper baud rate from within the program. Refer to the software's documentation for details. Other important settings are duplex, 7- or 8-bit ASCII, parity, and number of stop bits. (See accompanying box for definitions.)

JOE GELMAN is a contributing technical editor and the author of this month's buyer's guide.



SETTING UP

Duplex: Most bulletin boards and networks echo back to your system each character you transmit. When you set your terminal software to FULL-DUPLEX, the characters you type go through the process of transmission and echoing before appearing on your screen. When calling a system that doesn't echo, you must set your software to HALF-DUPLEX to see your own typing.

ASCII: the standard character code used by micros. Using 7-bit ASCII, you can transmit the entire alphabet as well as special control codes. Certain situations, such as the transmission of programs or special files, may require 8-bit ASCII.

Parity checking: a primitive form of error detection. Usually, NO PARITY is the appropriate setting, though some systems may require you to set parity to odd or even.

Stop bit: used to signal the end of each transmitted character, and seldom requires adjustment. One stop bit is the standard, though some software allows for a setting of 2 stop bits.

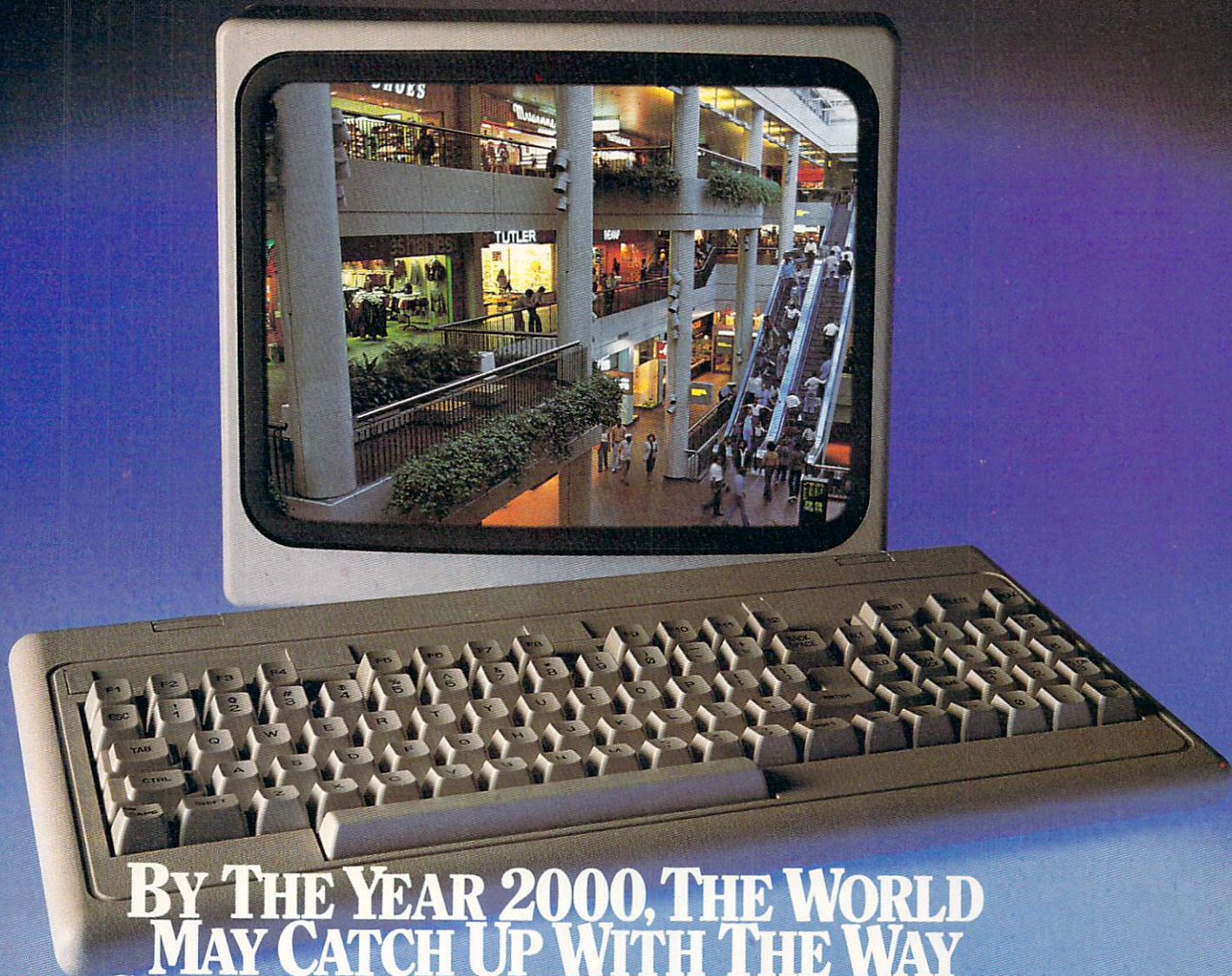
The important point is that you'll want to *match* the parameters of the system you're calling. If you're calling a commercial system (such as The Source, CompuServe, or BRS After Dark), the documentation provided when you subscribe will tell you which settings to use. For example, CompuServe requires full duplex, 8-bit ASCII, no parity, and 1 stop bit. You can access CompuServe and most commercial data bases at either 300 or 1200 baud. If you don't know the correct settings, the safest bet is full duplex/8-bit ASCII/no parity/1 stop bit. When using a commercial system, you'll also be asked to customize your account with appropriate settings (number of lines on the screen, etc.).

When a communications problem is your fault, it commonly is traceable to your parameter settings. Check the problem against this list before looking elsewhere.

Problem: You get double characters (DDOOUUBBLEE) on the screen.

Solution: Switch to full-duplex setting.

Problem: You see the other system's transmission, but not your own typing. **Solution:** Switch to



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TELECOMPUTING

half-duplex. You're in full-duplex, and the other side isn't "echoing" your characters.

Problem: About half the characters you see are inverse video or randomly garbled. **Solution:** Try adjusting the parity setting. If that doesn't work, it may be a noisy phone line.

Problem: Each new line is printed over the previous one, not on the next row. **Solution:** Set your program to ADD LINE FEEDS to carriage returns. If that's not possible, you have to readjust your line feed settings on the system you're calling. (This can be tricky to do!)

Problem: During uploads (sending a file from your computer), characters are dropped from the beginning or end of lines. This means you're transmitting characters a bit

faster than they can be received.

Solution: If your terminal program permits, set the DELAY AFTER CARRIAGE RETURN to a higher value.

If the system you've called is not operating correctly, what can you do? Not much. A malfunction on the other end is beyond your control. Luckily, that doesn't happen often. When it does, just give the sysop (system operator) time to catch the problem and fix it. Networks like The Source, CompuServe, and Dow Jones News/Retrieval Service have customer service lines you can call.

A GOOD CONNECTION

When you use a modem, you're reaching beyond your four walls to places up to thousands of miles away. Ma Bell (and now her offspring) does a fairly good job of routing

millions of calls around the world. Usually you get a clear line that's more than adequate for voice, and even modem communication. But modems aren't especially forgiving of a connection that's noisy or weak. If you dial a system and it answers with a carrier tone, but your modem won't "talk" to it, the line may well be at fault. First check that you're set to the correct baud rate. If that's not the culprit, hang up and call again. Repeated tries, especially over a period of time, may route your call through different lines and result in a better connection.

More common than a dead line is a "dirty" connection. This shows up as random characters interspersed with normal conversation. The problem is more pronounced at higher baud rates (1200 and up) and again,

MOVIE MAKER ANIMATION CONTEST \$1,500 IN PRIZES!!!

FAMILY COMPUTING, Interactive Picture Systems (IPS), and CompuServe are sponsoring The Movie Maker Animation Contest, with \$1,500 in prize money to be awarded between July 4 and Thanksgiving Day. The FAMILY COMPUTING FORUM on CompuServe (GO FAM 200) is now filling up with Movie Maker animation files. Wanna try your Walt Disney-best to top them? Here are the rules.

Prizes: Three prizes for the best animation received to date made with the program *Movie Maker* will be announced on July 4, Labor Day, and Halloween: \$200 for first place, and two \$100 prizes for runners-up.

The Grand Prize of \$300, for the best animation received (including all previous prize winners), will be announced on Thanksgiving Day.

Each winner will also receive a copy of *Animation: The Art and the Industry*, by Susan Rubin (Prentice-Hall, 1984).

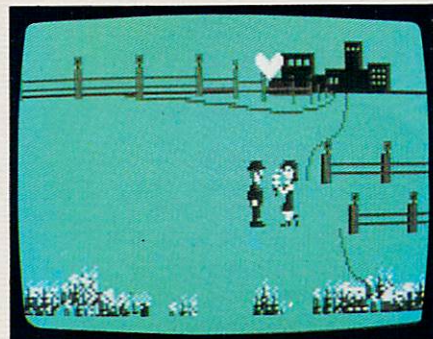
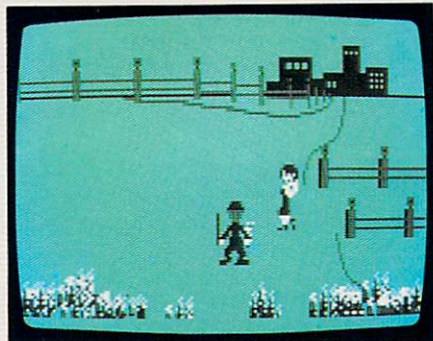
Deadlines: Entries must be postmarked or uploaded by: June 16 (for the July 4 award); Aug. 18 (for the Labor Day award); Oct. 13 (for the Halloween award); and Nov. 10 (for the Grand Prize).

How to enter: Entries may be submitted in two ways.

1. Upload animation files to DATABASE LIBRARY #1 (DL 1) in the FAMILY COMPUTING FORUM (GO FAM 200). Read the file MVMUPL.HLP (*Movie Maker* upload) for HELP.

2. Send disks (in padded envelopes) to Minerva Diaz, FAMILY COMPUTING, *Movie Maker* Contest, 730 Broadway, New York, NY 10003.

All submissions must include: 1. Title; 2. Brief description; 3. Name, address, and phone number of artist; 4. Type of computer.



Two frames of a *Movie Maker* animation, created by Bob Svihovec.

FAMILY COMPUTING will not return any submissions, and is not responsible for any loss of, or damage to, disks. Submissions become the property of the sponsors, and may be used for promotion or publicity. To be considered, submissions must be exclusive to FAMILY COMPUTING.

Eligibility: Anyone may enter except employees of Scholastic, IPS, or CompuServe, and members of their families.

Judges: Judges include Vincent Ceci, art director of FAMILY COMPUTING; Guy Nouri, president of IPS; Howard Beckerman, animation columnist for *Back Stage* magazine; Stan Goldberg, producer of hi-tech corporate exhibits; Phil Wiswell, software critic; Janet Benn and Yvette Kaplan, professional animators.

Submissions will be judged for composition (color, layout, texture), movement, content (sound effects and characters), originality, and creativity (special visual effects). Decisions of the judges are final.

The program: *Movie Maker*, marketed by Simon & Schuster, is available for Atari 800, Commodore 64, and Apple II computers (\$49.95). The program allows you to CREATE, SAVE, and RUN animation sequences.

While you need the program to create animations, you may view them without it. IPS has provided a number of professionally created animation files that are now in the FAMILY COMPUTING FORUM.

For more information, contact IPS at 42 E. 23 St., New York, NY 10010.

ON-LINE CONFERENCES

Guy Nouri, president of IPS, will be the special guest for the on-line conference in the FAMILY COMPUTING FORUM on Sunday, June 16, at 8 p.m. ET. Nouri, and other IPS designers and programmers will discuss ways to use *Movie Maker*.

Live conferences are held in the FAMILY COMPUTING FORUM on the first and third Sunday of each month. Read the Telecomputing column next month for a description of these and other conferences, which allow people around the country to discuss topics of common interest, or meet noted authorities in the computer field.

TELECOMPUTING

there isn't much you can do about it besides hanging up and redialing. Since some modems are more effective at filtering noise than others, you may have better results with a different brand.

THE PROPER PROTOCOL

Sooner or later, you're going to want to transfer or download programs to your computer, which leads us to another problem—software incompatibility. To download, you usually use a special method, built-in to your software, called "protocol transfer." The catch is, both you and the system you've called must be using the same method. Xmodem is by far the most widely used, but there are others, such as Hayes' proprietary and CompuServe's B-protocol.

Having Xmodem included in your software is an advantage. Unfortunately, there are subtle differences between each type of software that uses this protocol, and two Xmodems may not necessarily work well together. In particular, Xmodem performance on a network like CompuServe can be spotty. Luckily, many new communications packages are being written so that they'll work correctly with all Xmodem implementations. If you've yet to purchase a communications program, make sure the one you choose supports Xmodem and works well on the systems you'll use most.

It's impossible to anticipate every difficulty you might encounter, so we've outlined the most common ones. The more you telecommunicate, the greater the likelihood you'll run into strange problems. Keep a cool head and a steady hand on your manuals. If you still can't get the thing to work, you've earned the right to shut off the computer, lie down and try again later. Often, problems will vanish on their own! ☐

ELECTRONIC EDITION

FAMILY COMPUTING has started an "electronic edition" on CompuServe. Here, you may read fast-breaking news and reviews, post messages for the editors and other users, attend live conferences, and generally participate in the creation of a new electronic magazine. Type GO FAM at any CompuServe prompt to check it out!

You can also leave messages (e-mail) for FAMILY COMPUTING on The Source (account No. TI5483).

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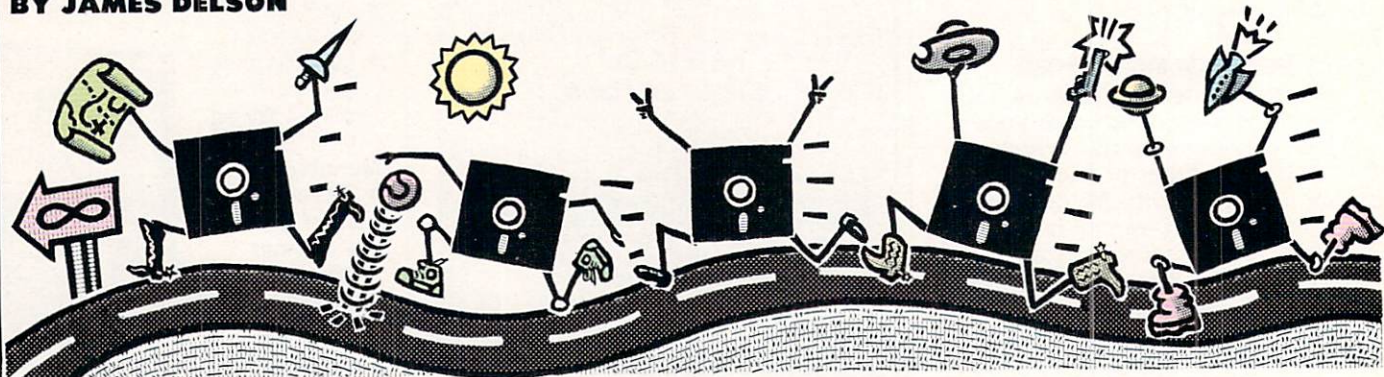
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GAMES

GAMES WITH LEGS

Finding a Game That Gives Long-Run Fun

BY JAMES DELSON



In Hollywood, when a film draws a wide audience over a long period of time, it's said to have "legs." *Star Wars* and *Chariots of Fire*, to name a couple, have this special quality. You could see them again and again and still come away having had a good time.

A few select computer games have legs, too. These are games that can be played over and over again without losing their thrill.

Tracking down such packages isn't easy. A few minutes spent on a game at the computer store, if you're lucky enough to have a store that allows for such prepurchase testing, won't reveal whether or not the game will last for months. Word of mouth may work, if you're lucky enough to have a reliable source.

Your best bet is to learn about the various kinds of software on the market before going to the store. You'll find that certain kinds of games tend to have better mileage, or a longer shelf-life than others.

FROM THE GROUND UP

Games have legs when they can grow as players progress. If a game requires hand-eye skill, it must provide enough challenge and new scenery to accommodate the most skilled hand-eye master. If it requires mapping or puzzle-solving, it must provide something more once the program's initial set of maps are drawn and puzzles are solved.

The best all around games for long-term use have been designed not only to be played and replayed, but to be restructured or even entirely rebuilt from the ground up.

Construction sets let you build your own game boards from scratch. Challenge friends and family members to navigate racetracks you've built (*Rally Speedway*), try pinball tables you've crafted (*Pinball Construction Set*), or jump, run, and climb their way to high point scores in custom-made ladder games (*Mr. Robot and his Robot Factory*, *Lode Runner*).

Many strategy and tactics games have built-in construction-set features. These historical or hypothetical recreations of military encounters set in a variety of different eras—from Roman times, through medieval times, to World War II and beyond—let you play through preprogrammed battles or make up your own parameters. Change the terrain you fight on, the number of your units and their strength, the amount of resources you begin with, or the power and sophistication of your munitions.

With this kind of flexibility, you can play a different game every time you take your seat at the computer. Some role-playing adventures have this quality, too. Electronic Arts' *Seven Cities of Gold*, for instance, a simulation of 15th century Spanish exploration, puts you in the boots of a conquistador. After you've mapped and colonized the New World, you can switch into a different mode and have the computer create a whole new New World to navigate and fame. *Galactic Adventures* is another good value. After you've tired of the existing worlds in the game, you can construct your own.

Games score well in the legs department if they are open-ended contests that two or more players can enjoy. Some sports games feature play systems and graphics that

actually simulate some of the excitement and variation you'd find in the real thing. Take *One-on-One* (Electronic Arts). This realistic basketball game pits one player as Julius Erving against another as Larry Bird, each with his own set of characteristics. With two players competing, the game can be as unpredictable as any one-on-one encounter. Many of the Olympic game simulations available (Epyx's *Summer Games*, for instance) are also long-playing. They combine good animation with a sensitive play system that requires practice in order to fare well. Each round of play brings new surprises.

IDENTIFY THE AUDIENCE

In addition to looking at the quality of a game, you should consider who will play it. Children under 8 are more interested in graphics and flash than they are in sophisticated play systems. For young children, a computer game is like a red balloon. They will love it and be delighted for 15 minutes. Then they'll want a blue balloon. Some of my younger play-testers don't care about point scores, as long as the colors and shapes keep flying.

Also, children, especially very young ones, love to play games with adults. When deciding on a purchase, think of whether or not the game in question would lend itself to a parent-child experience. You'll find that young children will keep going back if mom and dad do.

If a game does have legs, you'll know by how long it keeps a teenager's attention. Teenagers are tough to please. They have the kind of concentration, and the interest to get the most out of a good game.

Young children can be satisfied

JAMES DELSON, FAMILY COMPUTING's games critic, looks for games that have legs to stand on.

FAMILY FAVORITES

(Unless otherwise noted by a C, to indicate a game good for children, these games are suitable for adults and teens.)

CONSTRUCTION SETS

Lode Runner (Broderbund); Apple II series, Atari, C 64, IBM PC/PCjr. \$34-\$39 (C)

Mr. Robot and His Robot Factory (Datamost); Apple II series, Atari, C 64. \$34 (C)

Pinball Construction Set (Electronic Arts); Apple II series, Atari, C 64. \$39 (C)

Rally Speedway (Adventure International); Atari. \$49

The Shattered Alliance Toolkit (Strategic Simulations); Atari. \$15

STRATEGY AND TACTICS GAMES

Ancient Art of War (Broderbund); C 64, IBM PC/PCjr. \$44 (See Software Reviews this issue.)

Fighter Command (S.S.I.); Apple II series. \$49

Gulf Strike (Avalon Hill); Atari. Planned for Apple II series, C 64. \$39

Knights of the Desert (S.S.I.); Apple II series, Atari, C 64. \$39

Legionnaire (Avalon Hill); Apple II series, Atari, C 64, IBM PC/PCjr. \$25-40

Mychess (Datamost); Apple II Series, Atari, C 64. \$34

Paris in Danger (Avalon Hill); Atari. \$35 (See Software Reviews this issue.)

POLITICAL GAMES

Computer Diplomacy (Avalon Hill); IBM PC. \$50

Geopolitique (S.S.I.); Apple II series, C 64. \$39

President Elect (S.S.I.); Apple II series, C 64. \$39

FINANCIAL GAMES

Bank President (Infoware Corp.); IBM PC/PCjr. \$74

Cartels and Cutthroats (S.S.I.); Apple II series, C 64, IBM PC/PCjr. \$39

M.U.L.E. (Electronic Arts); Atari, C 64. \$40

Rails West! (S.S.I.); Apple II series, Atari, C 64. \$39

with a game with plenty of splash and variation within each sitting. But older kids and teenagers want a game that offers something new at each session. A game is exciting only if it consistently gives them a novel experience.

Old timers—those of us out of high school—tend to have different gaming standards. For a game to have legs, it has to meet another set of criteria. For one thing, adults have less time to spend on games. Their few gaming hours must provide maximum satisfaction. Games have to be fun and deep, and imme-

SIMULATIONS

Flight Simulator (Microsoft); IBM PC. \$49.

Flight Simulator II (subLogic); Apple II Series, Atari, C 64. \$39

SPORTS

The Activision Decathlon (Activision); Atari, C 64. \$31 (C)

Julius Erving and Larry Bird Go One-on-One (Electronic Arts); Apple II series, Atari, IBM PC/PCjr. \$39 (C)

Microsoft Decathlon (Microsoft); Apple II series, IBM PC. \$39

On-Court Tennis (Gamestar); C 64. \$29 (See Software Reviews this issue.) (C)

Summer Games (Epyx); Apple II series, Atari, C 64. \$39 (C)

ROLE-PLAYING ADVENTURES

Galactic Adventure (S.S.I.); Apple II series, IBM PC/PCjr. \$19

The Seven Cities of Gold (Electronic Arts); Atari, C 64. \$40

Sundog: Frozen Legacy (FTL Games); Apple II series. \$39

WORD GAMES

Monty Plays Scrabble (Epyx/Ritam); Apple II series, C 64, IBM PC/PCjr. \$29-\$39

ARCADE SHOOT-EM-UPS

Archon and Archon II (Electronic Arts); Apple II series (Archon only), Atari, C 64. \$40

Operation Whirlwind (Broderbund); Atari, C 64. \$39

Submarine Commander (Thorn EMI); Apple II series, Atari, C 64, VIC-20. \$19-\$44

GAMES FOR KIDS

Bristles (First Star); Atari, C 64. \$19-\$24

B.C. II: Grog's Revenge (Sierra); C 64. \$34

B.C.'s Quest for Tires (Sierra); Apple II series, Atari, ADAM, C 64. \$34-\$39.

Gateway to Apsah (Epyx); Apple II Series, Atari, C 64, IBM PC/PCjr. \$40

Rabbit Trail (Funware); TI-99/4A. \$9

Rock N' Bolt (Activision); C 64. \$29

diately pleasurable in one sitting.

For a game to be popular with adults in the long run, rules and play systems must be easy to master. Adults don't want to spend a lot of time learning new sets of rules each time they play. They want to be able to boot up the game and resume where they left off last session.

Accompanying this article is a selection of games I've found to be long-legged hits—winners that players keep returning to time and time again. Use this list and the guidelines to select challenges sure to go down as old family favorites. [E]



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ABC.E.G...	\$40	\$28	Archon II: Adept (E.Arts)
ABC.E.G...	\$40	\$26	Bruce Lee. 48k
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.....H...	\$40	\$26	Fast Load Cartridge (Epyx)
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AB.DC.GH.I	\$35	\$23	Froggie (MAC \$27)
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ABC...G...	\$45	\$29	Gertrude's Secrets (TLC)
ABC.E.G.IJ	\$35	\$19	Hard Hat Mack (Elect.Arts)
ABCD...IJ	\$40	\$26	Hitchhiker's Guide- Galaxy
....E.G...	\$35	\$23	Hitchhiker's Guide- Galaxy
ABCD.GH.IJ	\$35	\$23	Lode Runner (MAC \$27)
ABCD.E.G.IJ	\$40	\$26	MasterType (MAC \$33)
ABC...G.IJ	\$50	\$32	Math Blaster (Davidson)
ABC.E.G...	\$25	\$18	Memory Bldr:Concentration
ABD...G.IJ	\$40	\$26	Moptown Parade (Lrng Co.)
....E.G...	\$40	\$19	M.U.L.E. (Electronic Arts)
ABC.E.G...	\$40	\$25	Muppet Learning Keys
ABC.E.G.IJ	\$40	\$25	Murder on the Zinderneuf
ABC.E.G.IJ	\$40	\$28	Music Construction Set
ABC.....	\$50	\$33	Newsroom. 64k (Great!)
ABC.E.G.IJ	\$40	\$28	1 on 1: L.Bird & J.Erving
ABCD.E.G.IJ	\$40	\$25	Pinball Construction Set
ABC.E.G...	\$50	\$32	Print Shop (Broderbund)
AB...F.H.I.	\$35	\$21	Robotron (Atari)
ABC...G...	\$50	\$32	Rocky's Boots (Learn'g Co)
ABD.E.G...	\$20	\$15	Sargon II (Hayden)
ABCD.G.IJ	\$50	\$32	Sargon III (Hayden)
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ABC...G.IJ	\$50	\$32	Spell It (Davidson & Assoc)
ABC.....	\$40	\$26	Sticky Bear Programs (ea.)
.....G...	\$30	\$20	Sticky Bear Programs (ea.)
ABC.E.G.IJ	\$40	\$26	Summer Games (IBM Sept.85)
ABCD...G.IJ	\$35	\$23	Transylvania (MAC \$27)
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ABC...G.IJ	\$50	\$32	Ultima II,III (each). 48k
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.....G.IJ	\$40	\$26	Zork 1,2,3. (each)

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BY JEFFREY BAIRSTOW



I have noticed the word "emulator" several times in FAMILY COMPUTING. What is an emulator and can I use one with my Apple IIe?

FREDERICK WAITHE
Bronx, New York

An emulator usually is a program that attempts to make one computer imitate another, or to act like a particular type of terminal. For example, a terminal emulator might be used to make a personal computer perform as a Telex terminal for sending Telex messages. However, the term is used loosely to mean different things.

Communications software necessary for using a modem sometimes is called "terminal emulator" software. But it's still just communications software.

Emulators are often used on large computers to make them imitate older computers—avoiding the need

to rewrite software. Such emulators rarely are used on micros, but when the Commodore 64 was first introduced, an emulator (on cassette and disk) allowed it to run software written for the older Commodore PET.

For the Apple IIe, you can purchase a CP/M card (a circuit board that plugs into one of its slots) that allows the computer to run CP/M software, such as *WordStar*. This card is, in effect, an emulator, though it's not often described that way. Also, a RAM-disk program is sometimes called a "disk-drive emulator" (see *Dr. Cursor's Klinik*).

Is there any way I can protect my BASIC programs so other people cannot list or copy them?

ART CORNTHWAITE
Princeton, Illinois

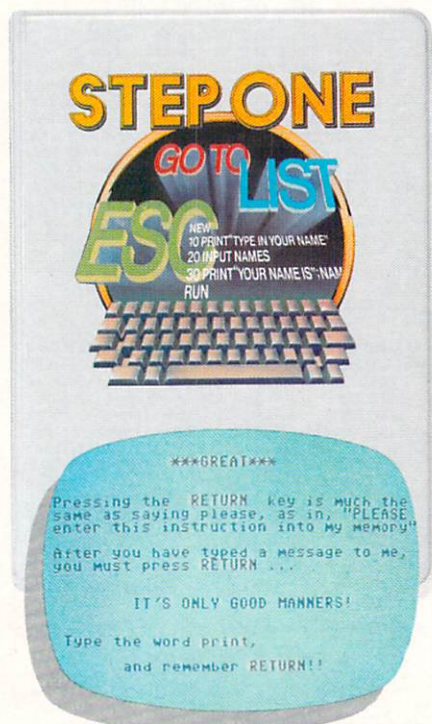
Being able to protect BASIC programs depends on what kind of

computer you have. You can buy utility programs for Apple and IBM that enable you to "encrypt" your files. These programs are intended primarily for business users who wish to guard sensitive information.

On some micros, you can protect your files through DOS without buying a commercial program. For example, most versions of Radio Shack's disk-operating system, TRSDOS, enable users to assign two types of passwords to files. One type is an "owner" password that gives the user complete access to the file; the other is a "user" password that allows the user a variety of options, all of which are set by the "owner." Most commonly, the "user" can read or run a file or program, but not make any changes.

These passwords are not printed on the file directory, so unautho-

Jeffrey Bairstow is a contributing editor to FAMILY COMPUTING.



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rized users cannot gain access to the protected files unless they know a password.

For computers using Microsoft BASIC, e.g. the IBM PC and compatible machines, the command `SAVE "FILENAME", P` will prevent anyone (including the author) from listing or editing a program. (For short "list disable" programs, see *Helpful Hints* in an upcoming issue.)

Do programs such as *Fast Load*, by Epyx, really speed up the loading of programs on the Commodore 1541 disk drive? Won't the program damage the drive?

BRYAN PANTOGA
West Des Moines, Iowa

Programs designed to speed up the Commodore 1541 disk drive, such as the Epyx *Fast Load Cartridge*, do indeed work. And, they work without harming the disk drive. Rather than hastening up the rotation speed of the drive, these programs use software techniques to speed disk access.

What is the difference between "data-base management" and "electronic filing" software packages?

CYNTHIA CLINTON
Durham, North Carolina

There are no precise definitions of data-base management systems and electronic filing systems. Generally, however, the term "data-base management" software is used to describe powerful software with features suited to business use, and the term "electronic filing system" is used by many marketers to indicate simpler, less powerful software designed for home users.

An electronic filing system is a computerized version of the information you might keep in a card file, a Rolodex, or a filing cabinet. The number of ways you can store and retrieve information varies, though usually you retrieve records from one file at a time. Pfs: *FILE* (Software Publishing) is an example of an electronic filing system that is easy to learn and use, and adequate for most tasks.

A data-base management system is a more powerful program that allows you to work with more than one file simultaneously. For instance, you might list a company in a "supplier" file, an "accounts payable" file, a "Christmas card list"

file, etc., and call up and work with all these records at once. In some cases, you can change the structure of the information you've stored without starting a whole new file.

In addition, many data-base management systems have a "query language," so records in the data-base file can be retrieved in a variety of different ways—no matter how you originally listed them. For instance, you might ask to find the records of all people who had received your Christmas cards for five years running without responding. *DBase III* (Ashton-Tate) is an example of an

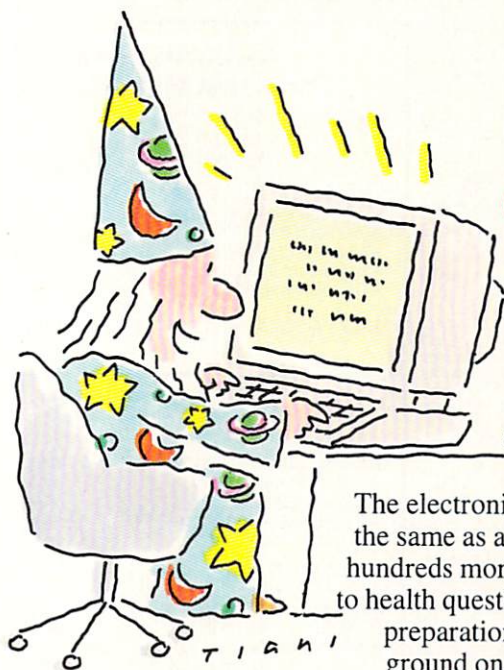
advanced data-base management system.

To choose the type of program that will work best for you, it helps to identify in advance the way(s) you will use it most often. Then you can test several types to see which best suits you.

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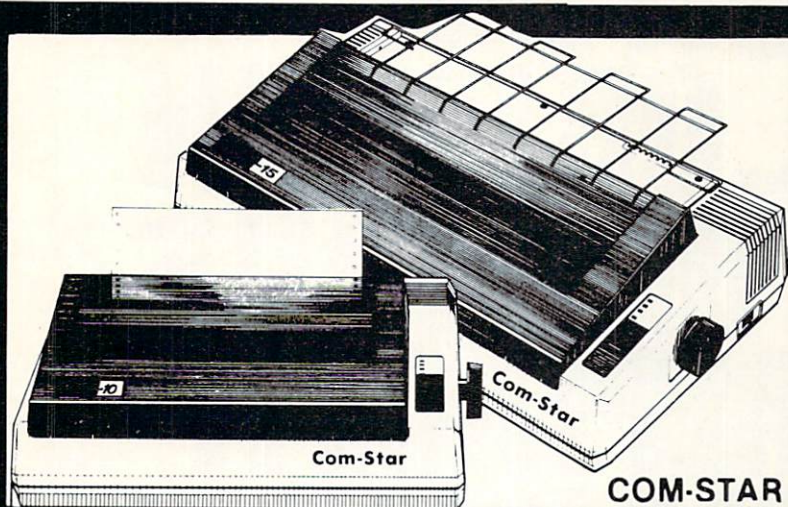
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BUYER'S GUIDE

COMPUTERS

BY JOE GELMAN

Deciding which computer to buy has never been easy for the first-timer. It's often hard to know what you want or need until you've spent some time with a computer. (See "Upgrading" for a look at why people buy a second one.) The task may be easier if you first identify the four major price/performance segments of the microcomputer market. (See accompanying box.) Do you want a low-end, a high-end, a heavy business, or a hot new computer? It helps to know what you're after. It also helps to know what you need. Read on and see if you can match your wants and needs to an affordable machine that's "you."

THE COMPUTER BUYER

To simplify the selection process, identify your primary reason for owning a computer. And look for computers that meet that need.

Home-school connection. Students are likely to want a computer that's good for programming and word processing, and that has access to a wide range of educational software. SAT and skill-building software can be a big help preparing for exams.

Home/money management. If you want a computer for standard home-and-money management tasks (budgeting, tax preparation, portfolio management), record-keeping and financial planning probably will be your primary applications. Unless you own silver mines and trade in commodities every day, a 64K or 128K computer should be more than enough memory for most people.

Home-office connection. Nobody likes taking work home from the office. But if you must, why not do it in style? With a system at home that's similar to the one at the office, you can put a disk in your briefcase and catch the 5:15 to Byteville!

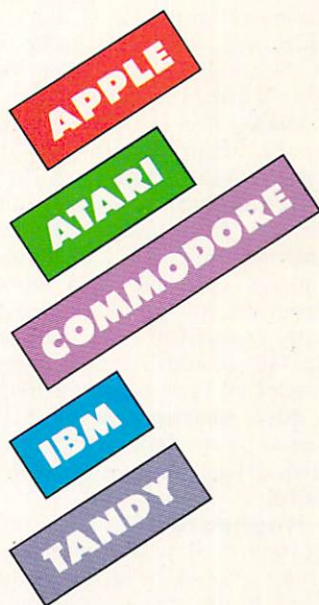
For most business-related applications, whether you're running a small business from home or bringing work to the house from the office, you'll want a computer that can run advanced spreadsheet, data-base, financial-planning, and chart-making programs. Such programs usually require computers with a minimum of 128K; if you're running your own business, you'll probably want more.

Hobbyist. A good number of people will have specialized uses for a computer, such as creating music or graphics. For these users, a built-in music-synthesizer chip, a MIDI interface for connecting the computer to electronic synthesizers, or a high-resolution color graphics display may be the prime consideration. Programmers, too, will look for different things, either specific features of the built-in BASIC, or the availability of other languages.

FEATURES TO CONSIDER

All computers are basically the same, but that doesn't mean you can run Lotus 1-2-3 on a Timex 1500. It means they're all based on the same principles, and with the proper programming (software) they can perform similar tasks. Any computer can be used for word processing or record-keeping, but one may do the job more efficiently than another. Generally, the more features a computer offers, the more it will cost, though you may be paying for

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JOE GELMAN is a contributing technical editor to FAMILY COMPUTING.



service and support. This certainly is true when you buy a computer through a certified dealer as opposed to a mass merchandiser.

In essence, given that most computers have certain special features that make them suitable for specific needs, what sets one computer apart from another is its capacity (memory) and ease of use. No matter what activity you're planning, you'll want to be comfortable while you're doing it. Although "comfortable" is a subjective term, here are a few elements to look for.

RAM. The capacity of a microcomputer is what puts it in the major or minor leagues. Capacity is measured in kilobytes (Ks), with each K equal to 1,024 bytes or characters. Random Access Memory (RAM) is memory available for use by programs. The more memory a computer has, the more useful it's likely to be. Think of RAM as "potential IQ." You can fit a more sophisticated and powerful program, and more of your own information (larger files), into a machine with 128K of memory than one with 16K or 64K. In addition, the more memory a computer has, the less often time-consuming disk-access will be necessary.

Disk Storage. A computer's capacity also can be measured by its disk storage space. For instance, the Apple II disk drives store only 140K, while the IBM PC drives store 360K.

Keyboard. "Comfort" means you like the layout of the keyboard. If you're planning to enter a lot of numbers, there should be a calculator-style numeric keypad. The "feel" of the keys is another consideration. Are they mushy or otherwise peculiar, or do they encourage fast, accurate typing? This is particularly important for word-processing and data-entry applications.

Screen Display. Comfort for your eyes is at least as important as comfort for your fingers. The computer should produce a clear image, free from wavy lines and other disturbances. Even when the monitor or TV is working correctly, some computers produce a poor image. If you're going to do a lot of word processing, an 80-column (80-character) display is a big advantage. To read 80 columns clearly, you'll need a monochrome or high-resolution RGB (Red-Green-Blue) color monitor. If you're going to want presentation-quality business graphics, make sure the computer has RGB color output.

Check the "resolution" category in the chart, which gives the number of pixels (vertically and horizontally) a computer can display. In general, the more pixels, the sharper the image. But some computers with the same resolution have a strikingly different display quality.

BASIC. For programmers, the features of the built-in BASIC are an important consideration. Does it support the graphics and sound of the computer (with commands such as PLAY, SOUND, PLOT, DRAW, FILL), or do you have to resort to arcane commands (PEEKs and POKES) to play a

simple note or draw a line? In general, the more commands in BASIC, the more powerful and easy to use it will be.

Other questions to ask: Does the BASIC allow easy screen-editing, so that you can fix mistakes in a program? Does it have "immediate syntax checking," to identify your mistakes as you enter a line?

Software. Another factor determining ease of use is software. A computer is only as useful as the software written for it. When deciding between two equally capable systems, the availability and quality of software will set them apart. That's one reason the Apple II line has had such a long life, and why IBM-compatibility (the ability of machines from other companies to run IBM programs) has become so important. With thousands of IBM programs available, and more on the way, an IBM-compatible has a fighting chance for success in the marketplace.

In general, you can expect computers that have been on the market for awhile to have available all the basic software tools—word processing, spreadsheet, data base, languages, games, etc. But if you want any task-specific software, find it before you buy a computer.

MAKING YOUR CHOICE

The following capsule reviews of models from the leading consumer computer-marketers will help narrow your choices. The company's current outlook and product line are examined. We don't list peripherals such as printers, modems, or specialized hardware, which are optional and readily available for most models. But be sure to keep these peripherals in mind when pricing a full system. Figure \$200 to \$300 for a disk drive, \$250 to \$350 for a good dot-matrix printer, \$300 to \$400 for an adequate

THE COMPUTER MARKETPLACE

4 Major Price/Performance Categories

Low-End Computers. These inexpensive computers generally have 64K RAM and 40-column screen displays, and are intended primarily for use at home. Strong points are their low price, good graphics and sound, and cartridge ports. They come with RF modulators for easy TV hookup. The Atari 65XE and Commodore 64 are in this group. Complete systems (with disk drive) start at approximately \$300.

General-Purpose Computers. These are "crossover" machines, which can be used for game-playing and education, but are well equipped for serious business applications. Some, like the Apple IIe and IIc (with extended 80-column card), Atari 130XE (with special monitor), and Commodore 128, have 128K RAM and can display 80 characters of text. These systems (with disk drive and monitor) start at approximately \$700.

Others in this category, such as the Tandy 1000 and IBM PCjr, can be expanded well beyond 128K (to 640K) and run high-level IBM-compatible business software. But, because they have good color and sound, they also can be used as general home-entertainment systems. Prices range from \$1,000 to \$1,500.

Business Computers. Most often used by medium to large businesses, this type of computer is for serious users only. The systems usually come with 256K RAM (and often 640K) and two disk drives, and are used with high-resolution RGB monitors and hard-disk drives. Prices for these computers, which include the IBM PC/XT/AT line, the Tandy 1200 and 2000, AT&T, Zenith, and Compaq computers, start at \$1,500.

The Kaypro 2X (64K) and TRS-80 Model 4 (64-128K) are business computers with limited power and monochrome displays, best suited for individual business users.

State-of-the-Art Computers. These hot computers charged with powerful microprocessors—the Apple Macintosh, and the promised Commodore Amiga and Atari ST—have attracted business people, hobbyists, senior citizens, and kids. Memories range from 128K to 512K (and possibly more), and screen displays are high-resolution. Special operating "environments" are designed to allow for "pull-down" menus and icons. Most software is operated with a mouse. Systems cost \$1,000 and up.

letter-quality printer, and \$100 to \$500 for a monitor.

The strengths and weaknesses of each computer are detailed and capped by an overall impression of the system. Specific technical data on each computer reviewed, and on others that offer a good price/performance value, can be found in the accompanying chart.

No computer is perfect, but some may be perfect for your needs. If the strengths are appealing, and the weaknesses don't seem important, then that computer belongs high on your list.

APPLE COMPUTER INC.

The name Apple is virtually synonymous with "micro-computer." Since 1977, computers in the Apple II series, with excellent support from magazines, users' groups, software developers, and Apple itself, have attracted more than 2 million owners. Apples are extremely popular in the schools, and there's a large library of educational software available for them. Many businesses, large and small, have installed Apples in the office as word-processing, database, and spreadsheet workstations.

Apple's line now consists of the expandable IIe, the IIc, and the Macintosh. (The once highly touted Lisa computer has been renamed the Macintosh XL.) The Mac offers the latest computer technology but sacrifices compatibility with the Apple II series. It is also Apple's main weapon in its battle for the business market against IBM.

APPLE IIe

Strengths. There's a vast selection of business, educational, and entertainment software for the IIe. One of the IIe's strongest points is its expandability. The internal plug-in card slots of the IIe support a wide variety of hardware add-ons (music synthesizers, modems, video digitizers, RGB output, a CP/M card, etc.). Memory can be expanded to 128K (and more, if you really want), and video display to 80 columns. Newly manufactured IIes use the same CPU chip as the Apple IIc, providing a high degree of compatibility with that machine's latest software.

Weaknesses. The Apple II series has limited built-in sound capability and its graphics are tricky for programmers to use. Due to the popularity of the IIe, it's priced high compared with newer, more powerful competitors, and is often sold as a "bare bones" unit that you must configure yourself. If the latest in sophisticated software is what you're after, you probably won't find it here.

Overall. A proven computer that's best for those wanting a large software base, or for those hobbyists who want access to the range of specialized add-on cards.

APPLE IIc

Strengths. The IIc is a transportable, compact version of the IIe with extra memory (128K), built-in 80-column capability and disk drive, and serial ports for a modem and a printer. It has a greater software selection than the 64K IIe because of its extra memory. The IIc is easy to pick up (it has a handle) and carry. Features standard on the IIc that are an extra expense for IIe buyers make this a better value for traditional applications such as word processing and telecommunications.

Weaknesses. The lack of card slots makes further expansion of the IIc difficult. This is only a problem for potential users on CP/M or other enhancements. The keyboard doesn't have the solid feel of the Apple IIe's, and some typists find it uncomfortable. You'll need special cables to connect non-Apple peripherals, and a serial-to-parallel converter to connect a parallel printer.

Overall. Well-designed, easy to carry, and especially affordable when bought packaged with the IIc monitor. All the advantages of IIe (except expandability) in a compact and attractive case.

MACINTOSH

Strengths. The Macintosh, which comes in 128K and 512K ("Fat Mac") versions, is a compact computer with a sophisticated operating system. The computer, high-resolution black-and-white monitor, and disk drive (3.5-inch) are contained in one unit; the keyboard is separate. Each Macintosh comes with a mouse, a device that takes the place of cursor-control keys. You control the screen cursor (and other icon objects) by moving the mouse on a flat surface. *MacWrite*, a word processor, and *MacPaint*, a fun-to-use and powerful graphics program, come packaged with the Macintosh. Most of the programs written for the Mac use "pull-down" menus, icons, and "windows." This common form, combined with the standard "point-and-click" approach of the mouse, makes learning different programs easier than on other systems. The range of sound output (four voices) is impressive.

Weaknesses. While software for the Mac finally is hitting the market, don't assume without checking that the program you need is available. Lotus' *Jazz*, expected to help sell the machine, has suffered delays. The 128K Macintosh can be amazingly slow and annoying to use with only one disk drive. Constant disk-swapping is less of a problem with the 512K "Fat Mac," or when you add an external drive. The display is black-and-white only. As with the IIc, the nonstandard serial ports force the user to buy Apple peripherals, or go to extra expense for special cables.

Overall. The Mac is an advanced and remarkably easy-to-use machine that has changed the way many users and software designers think about computers. The hi-res display is easy on the eyes and capable of detailed graphics—excellent for drawing and typesetting applications. Using a mouse instead of the keyboard can be an advantage. A lot of business executives end up taking the Mac home and keeping it there.

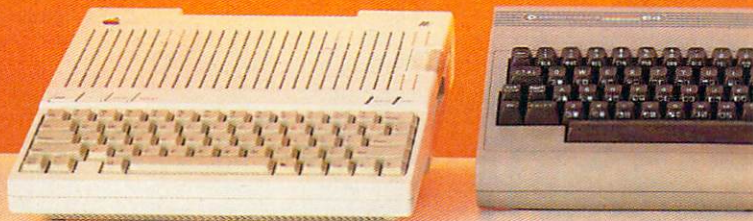
ATARI CORP.

The name's the same, but Atari is a much leaner, more aggressive company under Jack Tramiel than it was as a division of Warner Communications Inc. Tramiel's promise of "power without the price" (see "*Jack Is Back*," February 1985) has Atari watchers eagerly awaiting the new Atari ST series. And the new 130XE model is a welcome upgrade (128K) of the popular 800XL. Unfortunately, working models were not available for review, so we'll outline the announced features of the ST without editorial comment, and treat the XE as if it were an Atari 800XL.

65XE and 130XE

Strengths. These two computers are yet another incarnation of the venerable 800 line. They have four-voice sound, the same ANTIC video chip that's responsible for Atari's unique graphics, and compatibility with a sizable base of software. The Atari computer always has been highly reliable, and great for general home use. The XE series is reported to continue in that tradition.

The 130XE is the 128K version, and with the appropriate software, will provide greater storage capability for



APPLE IIc

COMMODORE 64

word-processing (AtariWriter Plus) and data-base applications. The keyboard has a new look, with graphics characters printed on the keys, and the function keys positioned along the upper-right instead of the side. Atari BASIC, with its powerful full-screen editor, is built in.

Weaknesses. While the Atari XEs still offer features not found elsewhere, they won't match the performance of more recently developed products. The built-in BASIC is useful, but limited in power. You can upgrade with third-party languages (BASIC XL and Microsoft BASIC) if you want more versatility. The uncertainty about Atari's future has caused a slowdown in software availability for the XL and XE line. If sales pick up, you'll see more products in the stores.

Overall. Few computers—at any price—offer the reliability, graphics, and sound features of the Atari XE line. The 130XE offers all the features of the 800XL, plus it has 128K of memory. Amateur and professional programmers alike love their Ataris, and wouldn't trade them for all the Apples in Silicon Valley. For the price it's selling at now, you almost can't go wrong.

ATARI ST

These details are based on preliminary documentation and a look at a preproduction model.

At first glance, the screen will remind you of the Macintosh—though the resolution of the preproduction model we saw was not nearly as sharp—but on closer examination you'll notice color (up to 512 colors reportedly are possible). The ST, which has 10 function keys and a numeric keypad, comes in two versions: the 130ST (128K) and 520ST (512K). The ST series will incorporate the GEM (Graphics Environment Manager) user interface, which makes use of a mouse, icons, and "pull-down" menus—just like the Mac. This software (from Digital Research, maker of the CP/M operating system), is designed to make sophisticated programs easier to use.

There's a long list of features planned: a three-voice sound synthesizer, a MIDI interface (the standard interface for connecting music keyboards and synthesizers), parallel and serial interfaces, a hard-disk-drive interface, built-in Logo, and high-resolution video output in black-and-white and color. The planned \$599 price does not include a monitor or disk drive, so the system price will probably be near \$1,000.

If the ST is delivered as planned, it will start its life with at least one drawback—little software. But since GEM also runs on the IBM PC, software developers should quickly bring titles to market. Anyway, Tramiel expects that the first buyers of the ST will be self-sufficient kids who can write their own software.

COMMODORE BUSINESS MACHINES

Commodore, maker of the Commodore 64, the best-selling microcomputer in the world, now has a new attitude toward users, and some new products.

In the past, one complaint about Commodore was lack of customer support and service, but a new help-line, (800) 247-9000, an agreement with RCA's nationwide service centers, and a commitment to support users' groups, should answer that. Despite these changes, the company

POPULAR COMPUTERS

COMPUTER	PRICE ¹	RAM: MIN/MAX	PRICE INCLUDES BUNDLED SOFTWARE
Apple IIc	\$1,195	128K	BASIC, ProDOS, tutorials
Apple IIe	\$895	64K/128K	BASIC
Atari 65XE	\$99	64K	BASIC
Atari 130XE	\$140	128K	BASIC
Atari 130ST/520ST	\$399/\$599	128K/512K	GEM user interface, BASIC or Logo
Commodore 64	\$199	64K	BASIC
Commodore 128	about \$300	128K	BASIC, tutorial, CP/M
Compaq Portable	\$2,495	128K/640K	BASIC, MS-DOS
Epson QX-16	under \$3,000	512K	Valdocs 2, MS-DOS, CP/M, BASIC
IBM PC	\$1,999	256K/640K	BASIC
IBM PCjr	\$999	128K/512K	BASIC
Kaypro 2X	\$1,595	64K	M.C.S BASIC, Star series, Mite
Macintosh	\$2,195/ \$2,795	128K/512K	MacWrite, MacPaint, Finder
Extended TRS-80 CoCo	\$159/\$259	16K/64K	Extended Color BASIC
TRS-80 Model 4	\$1,099	64K/128K	BASIC, TRSDOS 6.0
Tandy 1000	\$1,199	128K/640K	DeskMate, MS-DOS, BASIC
Tandy 2000	\$2,499	256K/768K	MS-DOS, BASIC

still considers itself the "king of mass merchandisers," committed to selling powerful computers at affordable prices.

The new computers are the Commodore 128 and the much-awaited Amiga. (An LCD laptop computer also is under development.) While Commodore is not officially retiring the 64, it's definitely taken a backseat to the more powerful 128. We've used a working prototype of the C 128; the version you'll find on the store shelves should be virtually the same. The Amiga is not yet ready for release, but software developers who have early versions in-house are impressed with its speed and excellent color graphics.

The Plus/4 (with built-in software) and Commodore 16 computers, which were introduced last year, have not been particularly successful in the United States; Commodore says they sell better overseas.

COMMODORE 64

Strengths. Though sales are finally slowing, the C 64 has been a dynamic best-seller for two years. The selection and availability of software for the C 64 are the best for any computer in its price range. Cartridge software, particularly easy for youngsters to use, is readily available. For music lovers, the three-voice synthesizer chip (SID) is a big plus. Piano-style keyboards and clever music-composition software take full advantage of the chip. A full array of low-cost and reliable peripherals are available, from modems to touch tablets to speech synthesizers. Due to the large number of owners, support from magazines and users' groups (and Commodore) is easy to come by.

Weaknesses. Unfortunately, the built-in BASIC language provides no support for the graphics and sound capabilities of the C 64. You must resort to PEEKS and POKES, or buy additional software, in order to take advantage of these features. The 1541 disk drive is very slow, although the newly released Epyx *Fast Load Cartridge* improves speed considerably. Also, unlike most systems, the drive is not capable of "self-booting" software. You must type a LOAD command to begin a program. Reliability has been a problem with the C 64 from the start, with an



COMMODORE 128

FOR HOME/SMALL BUSINESS USE

PRICE INCLUDES BUNDLED HARDWARE	CARTRIDGE	INTERFACES	DISK DRIVE STORAGE	STANDARD TEXT DISPLAY	NO. OF COLORS ¹	VOICES	SPRITES	RESOLUTION ²
Disk drive	N	2 nonstandard serial	140K	40 × 24; 80 × 24	16	1	None	560 × 192
None	N	9 expansion slots	140K	40 × 24	16	1	None	280 × 192
None	Y	Nonstandard serial	180K	40 × 24	256	4	4	320 × 192
None	Y	Nonstandard serial, expansion port	180K	40 × 24	256	4	4	320 × 192
Numeric keypad	Y	Centronics parallel, RS-232C serial, RGB, MIDI	360K-720K	varies	512	3	None	640 × 400
None	Y	Nonstandard serial, expansion port	170K	40 × 25	16	3	8	320 × 200
Numeric keypad	Y	Nonstandard serial, exp. port, RGB	360K-410K	40 × 25; 80 × 25	16	3	8	640 × 200
Disk drive, monitor	N	Centronics parallel	360K	80 × 25	16	1	None	640 × 200
Monitor, 2 disk drives	N	Centronics parallel, RS-232C serial	360K	80 × 25	B&W	None	None	640 × 400
Disk drive, keypad	N	5 expansion slots	360K	80 × 25	16	1	None	640 × 200
Disk drive	Y	RS-232C serial, RGB, 3 expansion slots	360K	80 × 25	16	3	None	640 × 200
300-baud modem, 2 disk drives, monitor, keypad	N	Centronics parallel, 2 RS-232C serial	392K	80 × 25	B&W	1	None	100 × 160
Disk drive, monitor, mouse	N	2 nonstandard serial, mouse	400K	varies	B&W	4	None	512 × 342
None	Y	Nonstandard serial	156K	32 × 16 ⁴	8	1	None	256 × 192
Disk drive, monitor, keypad	N	Centronics parallel, expansion port	184K	80 × 24	B&W	1	None	128 × 64
Disk drive, keypad	N	Centronics parallel, RGB, 3 expansion slots	360K	80 × 25	16	3	None	640 × 200
2 disk drives, keypad	N	Centronics parallel, RS-232C serial, RGB, 4 expansion slots	720K	80 × 25	16	1	None	640 × 400

FOOTNOTES

¹Price is manufacturer's "suggested retail price" for basic unit; ²Not all colors necessarily can be displayed at once; ³Highest resolution usually available in monochrome only; ⁴Uppercase only

unusually high failure rate out-of-the-box. The ports are nonstandard, so you need special cables to connect many peripherals. And the screen display is only 40 characters wide.

Overall. The C 64 is a good computer, but it can be difficult to use. It's adequate for home use (in fact, in many ways it's a classic "home computer"), especially if you use commercial software. It can be a lot of fun to use, especially for youngsters. Because of its music synthesizer, anyone with a passing interest in music need look no further. Because of its unreliability and slow disk drive, it's not recommended for business use.

COMMODORE 128

Strengths. The C 128 is a Commodore 64 and a whole lot more. An expanded keyboard with a numeric keypad is the most obvious improvement. But changes under the hood are even more striking. The C 128 operates in three different modes. In C 64 mode, it's 100 percent compatible with C 64 hardware (it has the same expansion ports) and software. That means you don't suffer the initial software shortage usually associated with new computers. And, if you're upgrading from a C 64, you can still use the 1541 disk drive, as well as any printers and modems you own.

In the C 128 mode, you have access to 128K of RAM, a brand new BASIC 7.0 (with more than 140 commands, including full support for all the graphic and sound capabilities of the machine), and a 40- or 80-column display (with an RGB monitor). There's also a built-in sprite editor (to create sprites) and a machine-language "monitor," which can be a great help when programming in the Commodore's machine language.

The third mode, which requires the new 1571 disk drive, is CPM 3.0. This granddaddy of operating systems gives you access to thousands of programs (many public domain), and business-quality software (e.g. *Wordstar* and the *Perfect* series). The 1571 drive is double-sided, and disks can hold up to 410K of data. It can transfer data much faster than the 1541.

Weaknesses. After spending a short time with the prototype, we couldn't find much fault with the overall

design of the C 128. It is, of course, based on old-fashioned 8-bit technology, the price of keeping compatibility with the C 64. Like any new machine, it's bound to have some bugs that need to be worked out. You may want to wait and see if early buyers are satisfied.

Overall. Too early to tell. But the C 128 is the computer Commodore should have come out with last year, instead of the ill-fated Plus/4. In fact, it's the first time that Commodore has introduced a new computer that's completely compatible with an existing one. Bravo!

IBM

The giant of the computer industry (and one of the most profitable companies in the world) is as strong in the business market (especially among Fortune 500 buyers) as Apple is in the schools. By the same token, IBM is as eager to break Apple's school stranglehold as Apple is to break Big Blue's office domination. But right now, the business-oriented IBM PC is still IBM's only real success in micro-computers.

The big question about IBM now is how it intends to approach the consumer marketplace. In March, IBM announced it was stopping production of the PCjr. Analysts said the company couldn't make money selling it at \$1,000, and above that price it couldn't attract buyers. In any case, IBM's expected to keep the PC/XT/AT line going, and to rethink the consumer market.

Rumors about IBM are a dime a dozen, so here are two to choose between: 1. IBM will come out with a new machine for the home market, priced at less than \$1,000, in late summer; 2. When IBM introduces the new "PC2" it will drop the price on the PC into the consumer's (and school's) range. Already, a 64K PC sells for about \$1,500 in some stores. Meantime, the PCjr should be in stock, and selling at bargain prices, for some time to come.

IBM PC

Strengths. If there's a computer "standard," the IBM PC is it. A number of companies, including AT&T, have brought out computers that imitate the PC and run PC software. Many of the best new business programs, and

certainly all the bestsellers, run on the IBM PC. Some, such as *Lotus 1-2-3*, *Symphony*, *Framework*, and other powerful business-oriented packages, run only on the IBM PC or compatibles. Strong third-party hardware and software support promises a steady flow of products (the PC has five expansion slots and can accept all types of add-ons). Memory expansion to a healthy 640K of RAM is possible. With the addition of a color adapter and monitor, excellent business graphics can be produced. The documentation supplied with the PC and available from other publishers is above average.

Weaknesses. The IBM PC isn't cheap—you can get the same power and features elsewhere for less. And the PC may be more computer than you need, especially for home use. The PC's-DOS (disk-operating system) is not the friendliest in the world, though you can get used to it.

Overall. If you have business to do, look here first. As the "standard," it's a good place to start. If you need more power or speed, you can move up to the PC AT; if you want a better price, you can try one of the IBM-compatibles. Since so many people in office environments use IBMs, you can count on belonging to a large "users' group."

IBM PCjr

Strengths. The PCjr runs a good number of IBM PC programs (but not as many as true "compatibles"), plus offers enhanced sound and color (16 hues) features—at a reduced price. (See "IBM PCjr Grows Up," in the May issue.) Some programs, such as *Lotus 1-2-3*, now come in a special PCjr version (two cartridges and a disk). This, and other programs, such as MECA's *Managing Your Money*, will not run on any other computer in the jr's price range. The jr's Cartridge BASIC (needed to run many programs) is a powerful language with special graphics and sound enhancements. There's some educational software in cartridge format, which is easy for kids to load and run.

Weaknesses. While it's possible to add a second disk drive to the jr, the addition is expensive. And a second drive is crucial for running many business programs. Furthermore, disk drives are marketed by third-party manufacturers, and they cannot be counted on to continue production now that the jr has been discontinued by IBM. Ditto for third-party software developers.

Overall. The PCjr is a spunky machine, great for gaming and educational purposes, that can also be used for business applications. Retailers should be offering it at significantly reduced prices until stock is liquidated. So, if you can find the software that will keep you going for a few years, the jr might not be a bad buy.

TANDY CORP./RADIO SHACK

Radio Shack's been in the microcomputer market as long as anyone. The TRS-80 Model I was introduced in 1977, and for a while was the country's best-selling computer. Radio Shack has since released Models II, III, 4, 12, and 16. It's still selling the Model 4 and the TRS-80 Color Computer 2, its low-end home model. One of the company's biggest successes, and Radio Shack's only market-share leader, is the TRS-80 Model 100 laptop computer

(and now, perhaps, the Model 200).

Times are changing, however, and Tandy has decided that IBM compatibility is where the action is. Its latest computer, the Tandy 1000, is the result of that new direction, and part of Tandy's Advanced Technology series (which includes the IBM XT-compatible Tandy 1200 and the fast, powerful Tandy 2000).

COLOR COMPUTER 2

Strengths. Over the years, the "CoCo" has developed a solid following among home users. There's a good selection of software and add-ons (even a mouse) available through Radio Shack stores, and even more through third-party mail-order vendors. Although the CoCo comes in a lower-priced 16K RAM configuration, you can do more with the 64K Extended BASIC version. Current owners cite the sophisticated OS-9 operating system (optional) and the 6809 CPU chip as a programmer's delight.

Weaknesses. Like a number of systems in this guide, the CoCo is graying around the edges. For the same or lower cost, you can get other systems that offer more versatility and features. The limited uppercase only, 32-character by 16-line display is a handicap if you're planning any serious application, especially word processing. While it can be upgraded, it's an inconvenient nuisance in this day and age.

Overall. In its time, the CoCo was a strong contender. For those who own one, it's still a viable, well-supported computer. But it's 1985, and potential buyers should look carefully at the competition. And while you're in the store, check out the Tandy 1000. . .

TANDY 1000

Strengths. The Tandy 1000 is IBM PC- and PCjr-compatible. Tandy claims the 1000 is the computer the PCjr "should have been." It runs all IBM PC software except four game titles. Important products such as *Lotus 1-2-3* and the *pfs* series will run on the 1000. Features optional on the IBM PC that are standard on the 1000 include a parallel printer port, color capability, and MS-DOS (disk-operating system). The keyboard has 12 function keys and a numeric keypad.

The *DeskMate* program comes with the 1000. This integrated software includes a spreadsheet, text editor, data base, and calendar with alarm. Telecommunications software and a built-in calculator also are provided. For some users, *DeskMate* may be all that's needed to make good use of the 1000.

Weaknesses. The built-in BASIC language is not 100 percent compatible with IBM Microsoft BASIC, which may affect those translating IBM BASIC programs. (A fully compatible Microsoft BASIC is in the works.) A relatively minor point is that there are only three expansion slots (as compared with five in the IBM PC).

Overall. The Tandy 1000 is well designed, backed by a stable company, and may be a good choice for budget-conscious buyers looking for IBM compatibility. The free *DeskMate* software is adequate for general use, but is not a replacement for full-featured programs. **FC**



TANDY 1000 WITH KEYBOARD

TRS-80 EXTENDED COLOR COMPUTER 2



Wander Into Wonderland!

ADVENTURE GAMES TAKE YOU ON A VACATION
TO A PLACE AS VIVID AS YOUR IMAGINATION

BY SHAY ADDAMS

You won't need a passport to vacation in faraway lands this summer—the boulevards of Paris and the pyramids of Egypt are only as far away as the nearest adventure game. Just don't expect a tour guide to show you around, for *your* decisions determine what happens on this kind of trip. If you type GO NORTH in an all-text adventure like *Zork*, the program will display a paragraph of prose describing the new location you've just reached: . . . CARVED OUT OF

ILLUSTRATION BY BARTON STABLER

THE LIMESTONE, THE ROOM GLOWS WITH DIM LIGHT PROVIDED BY PHOSPHORESCENT MOSS, AND WEIRD SHADOWS MOVE ALL AROUND YOU. A NARROW PATH WINDS AMONG THE STALAGMITES. But type in GO SOUTH and you may wind up at the local Club Med. Graphic adventures show a game's different locations, people, and objects with high-resolution pictures, and briefly sum up the situation in a few lines of text below.

In addition to sightseeing, you have a spe-

ADVENTURE-GAME GLOSSARY

Command: The instructions you type in to tell the program what you want to do next. In some adventures, commands are limited to a simple noun-verb combination, though the best games accept complete sentences.

Disk access: A program often must access the disk to obtain the next illustration or text, or to decide how to respond to a command.

First-person animation: With this technique, the entire picture changes to give the impression that you are moving closer to it. It's almost a 3-D effect.

Hard copy: Some adventures offer the option of simultaneously sending text to the printer, so you can study it for clues later on.

Parser: Invisible to the player, this part of an adventure "reads" your command by comparing it with

the words in the program's vocabulary. Well-programmed parsers enable you to concentrate on the game rather than on trying to communicate with the program.

Restore game: The act of loading a saved game to continue playing it.

Save game: An option that allows you to save a game in progress and return to finish it later. The necessary information automatically is stored on disk.

Spot animation: A technique in which a small portion of a graphic adventure's illustration changes quickly to simulate motion.

Vocabulary: The words that a particular adventure program will understand. Games with large vocabularies have various parts of speech, such as adjectives and adverbs, that expand the variety of possible actions.

cific goal to accomplish on your travels. It may involve solving a sinister crime or retrieving fabulous treasures from a forbidding cavern—but don't expect to stroll around casually scooping up gold and jewels. Access to many locations and hiding places is barred unless you possess special objects or passwords. The path may be blocked by a turbulent river, but after gathering logs and a vine from the jungle you could type `TIE LOGS WITH VINE` or `MAKE BOAT` and get across. This kind of logical problem-solving—in which you must rely on your brain rather than your reflexes and eye/hand coordination—is the essence of the adventuring experience.

HOW TO CHOOSE A GAME

To make certain you don't make reservations for the wrong destination, I've rounded up the adventures that most effectively stimulate the imagination and transport you to another world. In an all-text game, much hinges on the clarity and eloquence of the prose. In graphic games, the quality of the art and color schemes is important. Other factors I considered were whether a game's problems were ingeniously planned and whether clues and hints were distributed fairly. The intelligence of the program's parser—a part of the program that enables you to type in commands—and the extent of its vocabulary also were weighed.

Each game's suggested skill level is noted in the accompanying chart. If this is the first time you've gone adventuring, try an introductory-level game—too many people get frustrated and give up because they begin with a game that's designed for experts. After single-handedly finishing an introductory game, you'll be ready to try any of the novice-level adventures. The intermediate-level programs are best approached by people who have solved two or

three games from the lower skill levels. Advanced games require more patience and time (up to three months) to solve, and those described as "Masters only" contain the thorniest problems of all.

Though adventure games are designed to be played by one person, two or more heads can come in handy. And keep in mind that except for the varying skill levels and subject matter, most adventure games have similar play systems. Those listed in this article are all good, so choose the subject matter that excites your imagination, and wander into wonderland.

FANTASYLANDS

The most popular subjects for adventure games are fantasylands, science fiction, mysteries, and what I like to call (for lack of a longer name) the "Indiana Jones is alive and well in an adventure game" category.

Fantasylands are first on the itinerary, and *Zork* is the all-time classic. Inspired by William Crowther and Don Woods' 1977 *Original Adventure (Colossal Cave)*, *Zork* was written on a mainframe computer by students at M.I.T. An all-text game, *Zork* introduced the full-sentence parser, which allows players to type in more than two words at a time. When the students (Marc Blank and Mike Berlyn) founded Infocom and converted *Zork* to run on microcomputers, they sliced the game into three programs.

Zork I sends you into the ruins of the Great Underground Empire to retrieve a platinum bar, Neptune's trident, and 17 other treasures. The main obstacles are a murderous thief and a bewildering maze. With a fairy tale atmosphere, *Zork II* carries you deeper into a world ruled by magic as well as logic, where you encounter a dragon, a unicorn, and a princess. The Wizard of Frobozz will interfere with your quest for 10 more treasures, but his magical antics are often as funny as they are frustrating. The final game, *Zork III*, has a melancholy feel and an enigmatic goal that only becomes apparent as you penetrate the deepest regions of the underworld and come face to face with the Dungeon Master.

Some fantasyland adventures unfold in a "days of yore" setting. *Sherwood Forest* invites you to drop in on merry old England and fill Robin Hood's shoes as he seeks to win the heart of Maid Marian. Drawn in a cartoon style, the bright-color graphics are embellished with occasional spot animation, such as the shifty tax collector's eyes blinking open and shut. *King's Quest*, set in the mythical kingdom of Davenry, shows off the sharpest hi-res art ever seen in any kind of computer game. It also employs arcade-style animation to depict a young knave named Sir Grahame, whom you steer about via joystick or keyboard control on his quest to find a magic mirror, a magic shield, and a chest full of gold coins. The ugly trolls, a broom-riding witch, and some other nasty characters also are animated.

SHAY ADDAMS is publisher and editor of *Questbusters*, a monthly newsletter devoted to adventure games. He is also co-author of *The Greatest Games: The 93 Best Computer Games of All Time*.

Coveted Mirror is another "days of yore" fantasy. You have to locate a missing piece of a magic mirror before the evil King Voar gets it, or the land falls under his reign forever. Doors and windows actually swing open when you type OPEN DOOR, and other instances of spot animation enhance this good-looking game.

Based on a recent fantasy novel, *Dragonworld* involves an exciting journey to the imaginary territory of Simbala to save "the last dragon" from unknown captors. The screen shows 14 text lines, while most graphic adventures use only four. And instead of full-screen graphics, three small pictures across the top of the screen illustrate the story. (This is true of most of Spinnaker's Telarium adventures, which also include well-orchestrated music and sound effects.) *Dragonworld* has three joystick-controlled action games built in.

SCIENCE FICTION

Science-fiction adventures replace kings and dragons with robots and spaceships. In *Planetfall*, you crash-land on an uncharted planet and save an alien civilization from certain death. (What a holiday!) Floyd the robot, one of adventuredom's most personable characters, keeps you laughing throughout.

Another hilarious space epic, *The Hitchhiker's Guide to the Galaxy*, was adapted from Doug Adams' novel (see interview). In it, you journey across the universe to the legendary planet of Magrathea.

If you'd rather be juggling robots, visit the planet Contra in *Suspended*. The game presents an unusual challenge: A gang of robots serves as your eyes, ears, and hands while you tell them how to repair a damaged underground control center.

Back on planet Earth, *Fahrenheit 451* transforms Ray Bradbury's novel into an intriguing graphic adventure. The backdrop is New York City in the far future, where the fire department burns books instead of extinguishing blazes. Your goal is to foil its plans, which necessitates joining forces with the literary underground. Each rebel demands to hear a famous quote from classic novels such as *Moby Dick*, and many of the problems involve figuring out passwords. Bradbury worked with the programmers and wrote some of the game's text, which is unusually evocative and poetic.

WHODUNNIT?

More down to earth, mystery games put you in charge of investigating a crime. The classic example is *Deadline*, an all-text "whodunnit," written in the style of a Raymond Chandler novel. With an assistant named Duffy, you must unravel the murder of a wealthy industrialist by questioning suspects and digging up clues in Connecticut. If you'd rather visit Europe, *Earthly Delights* offers a first-class ticket. In Paris and the Swiss Alps, you'll track down a stolen painting and take on an international crime ring.

BEST ADVENTURE GAMES

GAME ¹	Style	Computer	Skill Level	Manufacturer	Price ²
FANTASYLANDS					
<i>Coveted Mirror</i>	G	AP	Novice	Penguin	\$34.95
<i>Dragonworld</i>	G	AP, C 64, IBM PC/PCjr (128K)	Novice	Telarium	\$32.95-\$39.95
<i>Enchanter</i>	T	see below ³	Intermediate	Infocom	\$34.95-\$39.95
<i>King's Quest</i>	G	AP, IBM PC (128K); PCjr	Advanced	Sierra; IBM	\$49.95 \$49.95
<i>Lucifer's Realm</i>	G	AP, AT, C 64	Intermediate	Zoom	\$39.95
<i>Microsoft Adventure</i>	T	IBM PC/PCjr	Advanced	IBM	\$34.95
<i>Sherwood F'est</i>	G	AP	Intermediate	Zoom	\$34.95
<i>Sorcerer</i>	T	see below ³	Advanced	Infocom	\$39.95-\$44.95
<i>Transylvania</i>	G	AP, AT, C 64, IBM PC/PCjr, MAC	Novice	Penguin	\$34.95-\$39.95
<i>Zork I</i>	T	see below ³	Intermediate	Infocom	\$34.95-\$39.95
<i>Zork II</i>	T	see below ³	Masters only	Infocom	\$34.95-\$44.95
<i>Zork III</i>	T	see below ³	Advanced	Infocom	\$39.95-\$44.95
SCIENCE FICTION					
<i>Cyborg</i>	T	AP, AT, C 64; MAC	Advanced	Sentient; Broderbund	\$34.95; \$39.95
<i>Fahrenheit 451</i>	G	AP, IBM PC/PCjr	Intermediate	Telarium	\$32.95-\$39.95
<i>Forbidden Quest</i>	T	AP, C 64, MAC, IBM PC/PCjr	Intermediate	Priority	\$39.95-\$44.95
<i>Hitchhiker's Guide</i>	T	see below ³	Advanced	Infocom	\$34.95-\$39.95
<i>Mission Asteroid</i>	G	AP, AT, C 64	Introductory	Sierra	\$19.95-\$29.95
<i>Planetfall</i>	T	see below ³	Advanced	Infocom	\$34.95-\$39.95
<i>Starcross</i>	T	see below ³	Intermediate	Infocom	\$49.95
<i>Suspended</i>	T	see below ³	Intermediate	Infocom	\$44.95-\$49.95
<i>The Tracer Sanction</i>	G	C 64, IBM PC/PCjr	Introductory	Activision	\$29.95-\$39.95
WHODUNNIT					
<i>The Alpine Encounter</i>	G	AP	Novice	Random House	\$29.95-\$39.95
<i>Deadline</i>	T	see below ³	Masters only	Infocom	\$44.95-\$49.95
<i>Earthly Delights</i>	T	AP, C 64, IBM PC	Novice	Datamost	\$19.95
<i>Masquerade</i>	G	AP, C 64	Masters only	Zoom	\$34.95
<i>Mindshadow</i>	G	C 64, IBM PC/PCjr	Introductory	Activision	\$29.95-\$39.95
<i>Ripper</i>	T	C 64	Novice	Avalon Hill	\$25
<i>Suspect</i>	T	see below ³	Advanced	Infocom	\$39.95-\$44.95
<i>Witness</i>	T	see below ³	Introductory	Infocom	\$34.95-\$39.95
INDIANA JONES					
<i>Amazon</i>	G	AP, C 64 IBM PC/PCjr (64K)	Player-adjustable	Telarium	\$32.95-\$39.95
<i>Infidel</i>	T	see below ³	Intermediate	Infocom	\$39.95-\$44.95
<i>Mask of the Sun</i>	G	AP, AT, C 64	Advanced	Broderbund	\$39.95
<i>Serpent's Star</i>	G	AP, AT, C 64	Advanced	Broderbund	\$39.95
INTERACTIVE FICTION⁴					
<i>Cutthroats</i>	T	see below ³	Novice	Infocom	\$34.95-\$39.95
<i>Mindwheel</i>	T	AP, AT, C 64, IBM PC/PCjr (64K), MAC	Intermediate	Synapse	\$39.95-\$44.95
KID STUFF					
<i>Below the Root</i>	G	AP, C 64	Introductory	Spinnaker	\$26.95
<i>Cave Girl Claire</i>	G	AP	Introductory	Rhiannon	\$39.95
<i>Gwendolyn: Pursuit of a Princess</i>	G	AT, C 64	Introductory	Artworx	\$19.95
<i>Mickey's Space Adventure</i>		AP, C 64	Introductory	Sierra	\$39.95
<i>Seastalker</i>	T	see below ³	Introductory	Infocom	\$34.95-\$39.95
<i>Swiss Family Robinson</i>	G	AP, C 64	Introductory	Spinnaker	\$26.95
<i>Tales of Discovery</i>	G	AP, C 64, IBM PC/PCjr	Introductory	Scholastic	\$24.95-\$29.95
<i>Winnie The Pooh</i>	G	AP, C 64, IBM PC/PCjr	Introductory	Sierra	\$39.95
KEY TO CHART					
T = all text; G = graphics; AP = Apple II series; C 64 = Commodore 64; AT = Atari; MAC = Macintosh					
FOOTNOTES					
¹ All games are on disk and require a minimum of 48K except Infocom's (32K).					
² Price varies depending on computer version.					
³ Most Infocom adventures are available for: Apple II series and Macintosh, Atari, Commodore 64 & Plus/4, IBM PC/PCjr, Tandy 1000 & 2000, TI-99/4A, and TRS-80 CoCo & Model III. In many cases, Commodore markets the C 64 version.					
⁴ Other games also qualify for this heading. See article text.					

Q. HOW DO YOU MAKE FICTION "INTERACTIVE"?

A. I DUNNO. ASK *HITCHHIKER'S* DOUG ADAMS.



Born in Cambridge, England, in 1952, Douglas Adams attended Cambridge University, where he collaborated with many of the comedy writers who later created "Monty Python's Flying Circus" and "Not the Nine O'Clock News" for British television. After graduating in 1974, Adams penned several episodes of the "Dr. Who" TV series before finding time to write a radio show called "The Hitchhiker's Guide to the Galaxy." The show's cult following turned into an international audience when Adams' book version was published in America in the early '80s. He recently completed *So Long, And Thanks for All the Fish*, which picks up where the Hitchhiker's trilogy left off. Adams had just finished the screenplay for the book when he discussed his adventure game adaptation of Hitchhiker's Guide and its potential effect on the digital watch industry and civilization as we know it.

Q: What was the first adventure game you played?

A: Original Adventure [the first adventure game, by Crowther and Woods], on The Source about a year-and-a-half ago while living in Los Angeles. I guess my first commercial game was *Suspended*. That was the only one I actually played to the bitter end and completely finished. I played *Deadline* and *Zork I* and *Starcross* about the same time, but never finished them.

Q: What about graphic games?

A: I'm not so interested in graphic games. I think text is better for the imagination. There's a role for graphics in the games if they do things that are kind of incidental to the story, but I wouldn't like to see not-very-well-realized sort of cartoon figures of the characters in the story. That would spoil it for me. I think, "Well I can imagine better than that. Why not just give me the text?"

Q: Are adventure games popular in England?

A: Yes, they are. I haven't played any of them. The thing is, in England there are more home computers per capita than anywhere else in the world. But they're mostly very small machines, Sinclairs, and an awful lot of them don't have disk drives and don't have a lot of memory. So games that require a lot of disk space and memory have not made commercial inroads in England. The Infocom games are pretty much a cult thing there. When I was doing *Hitchhiker*, I phoned around all the English bulletin boards to see what the level of awareness of Infocom was. It was very strong, but amongst a fanatical minority.

Q: You mention telecomputing. What's it like in England?

A: Not nearly as developed as in the U.S. for one simple reason: getting modems is a lot more difficult and expensive. If a modem runs at 1200 baud it won't run at 300 baud. They're two completely different standards. And the reason for this is that British Telecom has had (although they'll shortly lose it) a monopoly on anything to do with the phone system. And they're terribly, terribly slow and old-fashioned and don't like the idea of people having modems.

When I was working on the game [from England], with Steve [Infocom's Meretzky] in Boston, we did a lot of it by electronic mail.

Q: How does writing an adventure differ from writing a novel?

A: I suppose it's more a difference of degree than a fundamental difference. When you're writing a book you're constantly aware of the reactions you're trying to provoke in the reader: how you intend to play with or manipulate those reactions, and the surprises you're going to spring; whether you want to lull them into a sense of false security in which they think they know what's going on. You just have a much greater ability to do that when you're writing an adventure game, because you're actually soliciting the reaction from the player, and the program will then know how to deal with that response. So you're fooling around with the reader/player a great deal more. Which is a

natural extension of what you're doing when you're writing.

Q: What do you project for the future of adventure games as interactive fiction?

A: I feel that it's a completely new medium that we've only got one toe in—and there's a whole ocean out there. We're still very much constrained, I feel, by the traditional forms of novel writing. One doesn't necessarily need to be. I don't think breakthroughs come through suddenly, but that each time one sits down to work out a problem or the structure of an adventure game, I think you turn around the next corner and see another possibility and you turn another corner and you see another possibility. And every now and then it's as if you go past a little window or a little crack in the wall and you see a whole vast vista of possibilities. I think adventure games could become a very, very extraordinary and different, imaginative form of storytelling.

Q: Will it someday replace books?

A: People are always asking that silly question. Of course not. People said that about books when radio came out, and the same thing about radio when TV came out. But I think we keep on adding new media for storytelling. And none of them is killed by new forms. There's something particularly distinctive about the experience of reading a book; it's like nothing else. And nothing else will replace it. Something else may add to it, but nothing's going to replace it. I suppose TV dealt quite a nasty body blow to radio, which is a shame because I think radio is a much better medium than television. In the words of a small boy who was asked the difference between the two, "In radio the scenery is better." That's the strength of all text games—the scenery is better than that of graphic games.

I think there's an awful long way for adventure games, interactive fiction, whatever you want to call it, to go. And I hope that more people will come into that field from outside the computer field. Up until now, it's been rather like, well, imagine if everything ever written on a typewriter had been written by the guys who invented the typewriter.

—S.A.

For mystery with a twist, investigate *Mindshadow*. While suffering from amnesia, you crisscross 19th-century Europe searching for clues to your identity. *Mindshadow's* graphics represent genuine computer art, and the program includes a separate "adventure tutorial" as well as on-line help for beginners.

Robots of Dawn qualifies for two categories, since this computer version of Isaac Asimov's novel rockets you across the universe (science fiction) to determine who killed a robot (whodunnit). The program loads entirely into the computer's RAM, so no disk access is re-

quired—Commodore 64 adventurers will see the appropriate response to their commands almost immediately.

INDIANA JONES

There's no mystery about the inspiration of adventures that defy you to retrieve the treasures of ancient civilizations—Indiana Jones would feel right at home in any of them. *Infidel* is an invitation to explore a lost pyramid in Egypt, while *The Serpent's Star* concerns an expedition to find a fabled gem in Tibet. The latter is interspersed with cinematic first-per-

son animation (see glossary), so the snow-capped peaks seem to grow larger and closer with each step as you trek through the Himalayan mountains.

If Tibet is too far from home, how about South America? *Amazon*, written by novelist/film producer Michael Crichton, unfurls Telarium's finest full-screen graphics as you look for the lost city of Chak and its emerald mines. A wise-cracking parrot named Paco rides your shoulder and offers clues. So does a minicomputer that enables you to telecommunicate with your boss in the States. A pair of animated action games adds to the excitement.

INTERACTIVE FICTION

Amazon moves along in a more linear fashion than games such as *Zork*, which qualifies it for the trendy heading, "interactive fiction." This relatively new style of adventure (which includes *Deadline*, *Fahrenheit 451*, *Suspect*, *Earthly Delights*, and *Hitchhiker's Guide*) incorporates some of the elements of traditional storytelling, such as an emphasis on other characters (besides yourself!) and a more substantial plot. Straight adventure games like *Zork*, on the other hand, are more object-oriented—you find and use "things" on your way to find the treasure.

While the term "interactive fiction" has real meaning, it's also used somewhat loosely as a marketing term. Infocom, for instance, calls all its adventures "interactive fiction" to distinguish them from fantasy/role-playing games (such as *Wizardry*) and other entertainment software.

One good example of interactive fiction is *Cutthroats*, an all-text game in which you solve people-oriented problems as well as puzzles, solutions to which involve objects like ropes and keys. While preparing to dive for treasure off two ships in the bay off Hardscrabble Island, you'll eventually discover that success pivots around talking with the island's citizens and your crew members. This gets you involved with the characters and plot in much the same way you do when reading a conventional story.

A more recent work of interactive fiction, *Mindwheel* is the first in a series dubbed "electronic novels." Packaged with a book containing the first few chapters of a story that you complete by playing the game, *Mindwheel* assigns you the task of saving Earth from self-destruction. This can be accomplished only by traveling telepathically back to the beginning of civilization to find the Wheel of Wisdom. The trip takes you through the minds of four dead people—a rock star, a poet, a dictator, and a scientist—on your way to find the Cave Master who holds the Wheel. A highly advanced parser enables you to converse with the demons, winged people, and other weird characters more articulately than in any other adventure game to date. With truly entrancing prose and a warped sense of humor, the all-text story often verges on interactive poetry.



Amazon features a wise-cracking parrot named Paco that rides on your shoulders and offers clues. King's Quest (as shown here, waiting for the user's next command) "shows off the sharpest hi-res art ever seen in any kind of computer game."



KID STUFF

The newest kind of adventure games are those designed for young children. They are graphic (except for Infocom's *Seastalker*), and have parsers that require less typing. Spinnaker's Windham Classics, for example, are graphic adventures based on books like *The Swiss Family Robinson*. A "help key" comes to the rescue by showing verbs and nouns that might apply to the current problem. The parser, which completes a word after you type in the first few letters, reduces the need for typing skills, making the games suitable for young children (or bad typists). Good sound effects enhance game play.

Similarly, an adventure on Scholastic's Microzine called "The Dark Tower" allows you to enter single-letter commands—such as G for GET, W for WALK, etc. Other adventures for youngsters, such as Walt Disney's *Winnie the Pooh in The Hundred Acre Wood*, Sierra's *Mickey's Space Adventure*, and Scholastic's *Tales of Discovery*, require almost no typing, relying instead on a multiple-choice menu. In *Cave Girl Claire*, too, in which an animated figure struggles to survive the hazards of life in The Stone Age, actions are executed with a single keystroke.

Stone Age or Space Age, young or old, there's an adventure-game destination that's right for you. All you need to pack is your imagination. And the fun doesn't have to end come autumn—you can take an adventure vacation any time of year. ☐

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How to Make Your Move Go Smoothly—With a Computer

(AND...
HOW TO MOVE
YOUR
COMPUTER)

BY TAN A. SUMMERS

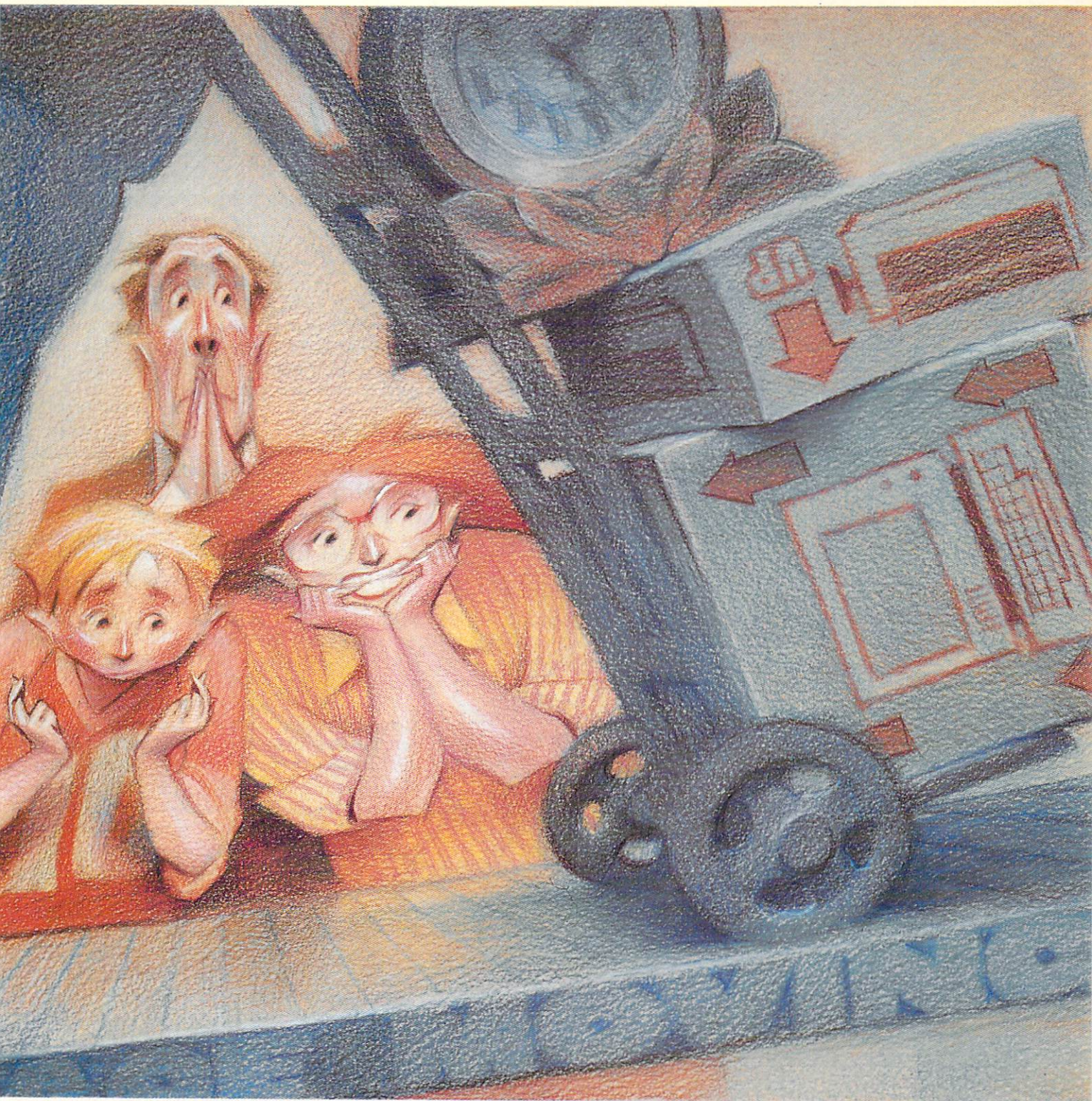


Last summer, our family was one of the thousands that packed up and moved to a new home. That may sound simple—but it wasn't. We have six children, two pets, and three computers complete with monitors, printers, and the usual assortment of software.

Although our family has moved a number of times, this was our first move as computer owners, and we were concerned about how all that expensive hardware and software would weather the trip from Kilmarnock, Virginia, to

New Orleans, Louisiana. We knew that moving companies are accustomed to packing stereos, televisions, and such—but computers seem to be more sensitive than other electronic devices. Disk drives can be harmed by dust as well as jolts, and both hardware and software can be damaged by heat and cold. But we learned that moving *with* a computer can actually make the experience easier. There are a variety of ways the computer can aid the planning to make it a smoother move for the whole family.

TAN A. SUMMERS is a freelance writer and programmer and a regular software reviewer for FAMILY COMPUTING.



PLANNING THE MOVE

If your software library includes productivity software such as a word processor, data-base program, or spreadsheet, you can use these programs to help prepare for the move. Some tasks can be performed by more than one software tool, so you don't need to have all three. (See accompanying box for a checklist of ways to use your software.)

Of course you'll use word processing to handle the extra correspondence that goes with a long-distance move, like updating your job history and arranging job interviews. You also can organize the notes you ordinarily would keep on scraps of paper and the backs of envelopes into a useful plan of action for your move.

Either word-processing or data-base software can come in handy when you shop for a new home. For example, we typed up a list of important criteria and used printouts for note-

**THIS WAS OUR
FIRST MOVE
AS COMPUTER
OWNERS AND
WE WERE
CONCERNED.**

ILLUSTRATION BY CARTER GOODRICH

taking at each house we examined. Afterward, it was easier to see which property best fit our needs.

Next, use word-processing, data-base, or even spreadsheet software to make an inventory of your belongings. It's a good idea to keep an up-to-date household inventory for insurance purposes even when you're not moving.

If your family is like ours, you probably receive a number of magazines. It's expensive to have the post office forward them to your new address, so send publishers a change-of-address form six weeks in advance. Use either data-base or word-processing software to print out a set of gummed labels containing the publishers' addresses, and another set with your new address.

FOUR WEEKS BEFORE THE MOVE

Unless you're going to rent a truck and do the loading and driving yourself, now's the time to decide which moving company to use. The procedure we used (a spreadsheet) could help you compare various carriers' weight and cost estimates and special services to help you decide which to use. (See chart for sample cost comparisons.)

Put your spreadsheet software to work to anticipate moving costs based on these estimates. The computer can help you decide whether or not you can afford to have the movers pack your belongings, and what kind of insurance coverage is the most sensible.

address and phone number, and another of those you want to contact after you move. You can notify them using the same technique you used for periodicals, or you can send more-personal letters. (If your word processor is equipped with mail merge you can handle these letters easily if all the addresses are already on disk.)

MAKING THE MOVE

If you're worried about protecting your investment in computer equipment and software, start with correct packing and shipping. Also, you'll want adequate insurance coverage in case something goes wrong and your computer and software are damaged in the move—despite all of your precautions.

PACKING

The first rule is: "Pack it in the box it came in." The shaped foam-plastic packing and cardboard inserts that come with most computers are the best protection they can get. Don't panic if your boxes have long since been discarded, though. Careful packing with blankets or towels in sturdy boxes will suffice. Monitors can be treated like television sets, which are wrapped in padding before being carefully loaded onto the moving van. Pack software in rigid containers, with foam-plastic pellets or other packing to keep it from shifting.

If you plan to have a moving crew pack your belongings, oversee the handling of your computer to make sure it's done correctly, or do it yourself before the crew arrives. We forgot to remove the RF adapter from our television set, and it arrived at our home in pieces the driver had swept up from the warehouse floor. A monitor cable we left to chance was packed in a box of books, rather than with the monitor, and it took days to find.

A word of warning: Moving companies won't reimburse you for damage to a computer you've packed yourself unless the outside of the carton shows obvious signs of mishandling. If you prefer to pack your equipment yourself, leave the box unsealed and have the driver check it before loading it on the truck.

SHIPPING

You can entrust your hardware and software to the moving company, take them with you in the car, or ship them by a commercial parcel service. We used a combination of methods.

The working copies of our software and our IBM PC (whose boxes had been discarded) made the trip on the floor of my husband's air-conditioned car. Our Commodore and a Macintosh loaned by a publisher, went in the moving van, clad in their original boxes. Original copies of software went air express.

In an effort to determine the safest method of transporting software, we experimented. We

SAMPLE MOVING COST COMPARISON CHART
Distance (miles) 1,057 Weight (pounds) 8,000

COMPANY:	ACME	MOVE SAFE	EVER-READY
Basic Rate (per 100 lbs.)	\$37.25	\$26.50	\$35.25
Rate	\$2,980.00	\$2,120.00	\$2,820.00
Extra pickup or delivery	\$38.50	\$31.75	\$32.90
Servicing of appliances	\$25.00	\$16.45	\$25.00
Piano handling	\$35.00	\$42.10	\$40.40
Stairs/distance carry	\$56.78	\$45.00	\$50.00
Load/unload bulky article	\$85.00	\$85.00	\$80.35
Containers	\$256.71	\$196.78	\$211.20
Packing	\$305.00	\$200.00	\$210.00
Unpacking	\$265.35	\$103.50	\$97.45
TOTAL	\$4,047.34	\$2,840.58	\$3,567.30

This printout, comparing quotes from three different carriers, illustrates how you could use your spreadsheet to compare moving costs.

This is a good time to start setting up a category for moving expenses in your home-budget or accounting program. Whether your employer reimburses you for these costs or you use them as deductions at tax time, you'll need an itemized list of move-related expenses. Keep receipts as the move progresses, then enter the items in the proper categories after you arrive at your destination.

THREE WEEKS BEFORE THE MOVE

Earlier you made labels for change-of-address cards to be sent to publishers. Now compile a list of friends, relatives, business contacts, and others who need to know your new

made three identical copies of a frequently used disk, which then went back into its container to make the trip by car. One of the copies went into a packing box full of computer books, protected by the lightweight cardboard box in which it was purchased. A second copy went by air express with our main software shipment. The third copy, in a cardboard mailer, was stuffed into the glove compartment of the van I drove to New Orleans. There it spent not only the entire 1,100 mile trip, complete with lengthy stops in hot parking lots while the children got drinks and checked out bathrooms, but also an additional three weeks of driving about town in the New Orleans summer heat until I remembered to retrieve it.

To our surprise, the only disk that didn't work on arrival was the one shipped in the moving van. Heat had not been its downfall. Instead, it had been hopelessly bent, folded, and mutilated as the books surrounding it shifted during transit. We decided that careful packing probably is more important than the method of shipping you choose.

MOVING DAY

If you do send your computer equipment by moving van, post someone right beside the computer on moving day until it's loaded, and make sure that each piece of computer equipment is listed on the invoice. Check again before you sign the inventory. When we moved, even the Macintosh computer and printer, in their original boxes, were listed on the driver's invoice as unidentified "cartons" until we insisted that all computer equipment be itemized. The same is true of software.

Your responsibility doesn't end when the equipment is safely loaded on the truck. Once it arrives at your new home, you are expected to faithfully check off each and every one of the hundreds of cartons and furniture items as the movers bring them in. If a carton of software or item of computer equipment is missing or damaged, you must note the loss on the driver's inventory before signing it in order to collect reimbursement from the movers. That's the ideal plan, but with several moves' worth of experience and several hundred items to check, we knew we wouldn't be that stalwart. We used our household inventory to check off computer equipment and other valuable items as the moving crew brought them in the door, then located the missing and damaged items on the driver's inventory during a lull in the activity later.

INSURANCE

No matter how carefully you plan your move, accidents can happen. Make sure your belongings are adequately insured against damage and loss. Several degrees of protection are provided by the moving company itself. The basic rate automatically provided by the carrier is commonly 60 cents per pound per article. This works out to as little as \$200 for a large

A COMPUTER USER'S MOVING COUNTDOWN

(KEY: WP = Word Processor; SS = Spreadsheet; DB = Data-base program)

When You First Decide to Move

Compare value of houses and apartments as you look for a home in your new location (WP, SS).

Compare options and estimates offered by various moving companies (WP, SS).

Six Weeks Prior to Move

Create and mail change-of-address labels for all periodicals to which you subscribe (WP, DB).

Four Weeks Prior to Move

Create or update household inventory; make hard copy to take with you in the car (WP, DB, SS).

Organize a garage sale (WP, DB).
Itemize contents of boxes you pack (WP, DB).

Three Weeks Prior to Move

Create address and telephone number list of local names and addresses to use in new location (WP, DB).

Create address labels for friends, relatives, business contacts, creditors, clubs, and any others who will need your new address. Send change-of-address cards (WP, DB).

One Week Prior to Move

Create itemized list of computer

equipment and other valuable items being shipped. Include list of software (WP, DB).

Arrange for all-hazard insurance for computer and software.

Four Days Prior to Move

List items to take with you in the car (WP, DB).

Three Days Prior to Move

Disconnect computer equipment and pack, or get ready for packing by commercial packers.

Two Days Prior to Move

Oversee the packing of your computer.

One Day Prior to Move

Ship software using parcel service.

Moving Day

Oversee loading of computer equipment, making sure it's properly listed on the driver's invoice.

Arrival Day

Carefully check to be sure all equipment has been delivered. Arrange for software to be delivered if held at parcel-service warehouse.

Throughout the Experience

Keep track of moving expenses for reimbursement or tax purposes with home-budgeting or spreadsheet program.

computer like an IBM PC, so it's a good idea to pay a little more and get extra coverage, either at depreciated or replacement value. Depreciated-value coverage reimburses you the amount the object was actually worth at the time it was shipped (your household inventory comes in handy here). The more expensive replacement-value coverage provides enough money to replace a damaged item at the current market cost.

The coverage provided by the moving company almost always is limited to cases where there is obvious exterior damage. Unfortunately, damage to a computer from a jolt or extreme temperature is almost always *invisible*. Unless a qualified repairperson determines that the damage definitely resulted from mishandling by the moving company, you won't be able to collect reimbursement for malfunctions not accompanied by obvious damage. Some agents we interviewed claimed that their companies were more lenient, but the "obvious damage" rule is the industry standard.

If all this talk about planning, packing, and insuring has left you feeling exhausted, relax. Relocating your entire family is a major event, but it doesn't have to be traumatic. With a little foresight, you can ensure that your family will be back in the normal routine, computer and all, in no time. **FC**

UPGRADING

EXPERIENCED USERS ARE BUYING NEW COMPUTERS WITH MORE MEMORY, MORE SOFTWARE, MORE SPEED, MORE... MORE... MORE...

BY ROBIN RASKIN

REASONS GIVEN FOR BUYING A SECOND COMPUTER:

47	% Outgrew capabilities of first one
36	% To get better software
33	% To do office work at home
29	% Two or more users in household
24	% To get better price/performance
18	% For children's use

Note: Figures add to more than 100% due to multiple answers.

Families grow too big for their living quarters, kids too big for their britches, plants too big for their pots—and sure enough—computer users outgrow their computers. As with clothing, you can deal with outgrown computers by letting the hems out (expanding what you have) or starting anew with the next size (a more powerful computer). More and more people are choosing the latter path. It's easy to figure out when your clothes don't fit, but what are some of the reasons users give for outgrowing computers?

Watching my own family outgrow them gave me inspiration to research this new trend in computer usage. My Dad abandoned his Atari 800 to buy an IBM PC, the same computer he used at his law office. And my antiquated S-100 CP/M computer system with 8-inch disk drives, which my husband introduced me to years ago, now sits in a corner, watching new technology pass it by. As my computer hobby has turned into a profession, the old machine has been replaced by an Apple IIe, an IBM PC, and a Macintosh.

I've talked to innumerable people who've experienced growing pains of some sort and have upgraded to a more powerful computer. Some wanted more memory to run larger or more sophisticated programs; some a machine that could help with office work; some a machine with a greater selection of software; some a machine better supported by computer stores; and some a machine with a wider variety of peripherals at better prices.

Andy Bose, director of microcomputer marketing at Link Resources, a New York market research firm specializing in technology trends, confirmed my informal survey with some significant statistics. (According to Link, a home computer is defined as being used exclusively at home and

purchased with household funds, not subsidized by business.) Bose reported that a sizable group of computer owning households already had two or more computers (13 percent), or were planning to buy a second computer in 1985 (11 percent). Link's national survey of 4,200 people indicates that people who buy second computers have found good use for the first one—and want to do more with computers. To do so, they need more computing power. "The numbers indicate a decided trend toward buying top-of-the-line computers like Apple IIcs, Macintoshes and IBM PCs," summarized Bose. More than 50 percent of those planning to buy indicated their next purchase would be an IBM or Apple computer.

It is exactly this trend that Atari's president, Jack Tramiel, hopes to capitalize on with the new Atari ST computers. As he told *FAMILY COMPUTING* ("Jack is Back," February 1985): "The 20 million kids who bought Atari videogame machines, or VIC-20 computers, are ready to graduate."

BUYING TIME

"Time is my most precious commodity," says Gary Straub, a busy sound technician and deejay, who lives near Atlantic City, New Jersey. "My Timex 1000, with its 16K, needed about six minutes to load my data from the cassette. That's not a time saver! I needed more memory and a system that used a disk drive to run the kinds of data bases and spreadsheets I wanted to use," he says.

Realizing that it didn't pay to computerize unless you actually saved time, Gary began his quest for a new, "faster" computer. Last April, he bought an Apple IIc. For a while he kept both computers working concurrently, because the Timex cassettes held a lot of his important data. As a sound technician with a computerized data base of musical

records and tapes, and as a deejay with his own business to run, Gary now depends on AppleWorks (an integrated package for the Apple II series) to keep his home and business finances in order.

"When I got my Apple" he says, "I had boxes of important papers—flyers, announcements, product offerings, addresses. I began entering the data and tossing out the paper. In the six months that I've had the Apple, I've filled 60 disks with data. I never could have done this so easily with cassettes.

"When I bought the Timex more than two years ago (about \$250 with printer and cassette), I didn't want to invest any more money. My new Apple IIc cost considerably more," he says, "but I'm ready to do more."

GETTING THE RIGHT TOOL FOR THE JOB

"My father kept asking me why I wasn't using my computer for my schoolwork," recalls Anthony Maglioglio, a 22-year-old engineering student from Queens, New York. "I kept telling him my TRS-80 Color Computer just didn't have the kinds of software or hardware I needed. I wanted to use my computer for schoolwork, but sometimes you just don't know what you really need until after you make a purchase."

Anthony didn't really want to buy another computer system, but felt he had no other choice. "The CoCo would have needed a lot of expansion before I really could have used it," he says, referring to a disk drive and the add-ons he needed to increase the CoCo's screen display from 32 to 80 characters, and from just uppercase letters to lowercase as well. "And the expansion was expensive."

Anthony was enticed by IBM's promotion for the PCjr last Christmas, when the company was virtually giving away an RGB monitor. "The IBM

OF THOSE WHO HAVE COMPUTERS:

13% have two or more

11% plan to buy a second one in 1985

Link Resources

PCjr had everything I needed at an affordable price. Although I learned a lot about BASIC on my CoCo," he says, "with my PCjr I already can see I'll be doing a lot more." (Editor's note: In March, IBM announced it was stopping production of the PCjr.)

Anthony feels his second purchase was much more directed than the first. "When I bought the CoCo I just wanted a computer, but I didn't know what I'd want to use it for. This time I decided to spend the money to get good tools. Good tools include software as well as hardware. I've used my PCjr more in the past two months than I used CoCo in three years."

PRODUCT SUPPORT

"I was sorry to see Texas Instruments drop out of the home computer market," laments Kay Shaffer of Albuquerque, New Mexico. "I loved my TI-99/4A but needed more support." Kay now owns a Commodore 64, but she gets nostalgic about the TI-99/4A she abandoned when it was discontinued by TI. "It was a computer with some nice built-in features like line numbering and sequencing for its BASIC. The graphics, music, and sprites were relatively simple to work with. But once TI stopped selling the 99/4A, it was a dead end for me."

The Commodore 64 makes Kay's "support" life easier. "Now when I walk into the local store to buy software I have hundreds of choices. Before there was no choice."

Still a bit frustrated with some of Commodore's idiosyncrasies, Kay is making the transition slowly. To get the most out of her computers she still uses both, picking the one most appropriate for any given task.

OFFICE COMPATABILITY

Lester Raskin, my father, had an Atari 800 he used for home record-keeping, but that was before he had

computers installed in his law office. With IBM PCs in the office and an Atari at home he had no peace. "Bad enough you've got to remember one computer's set of commands," he says. "I couldn't switch back and forth between machines. Besides, the data bases available for the PC make my old Atari file manager look primitive." So he bought an IBM PC.

The Atari 800 was lovingly handed down to his grandchildren. "Presumably they'll get more out of it than I ever did," he said, sizing up the new computer generation.

HIS AND HERS

Steven and Sherry Rubin of Philadelphia had a small living space, hence they had a small computer, an IBM-compatible Compaq, which can be carried like a suitcase. As their living space increased, so did their desire for a computer with a larger screen display and more storage capacity. They bought a Columbia computer (also IBM-compatible) with a hard disk. The hard disk meant no more disk swapping; the applications programs are all stored on the hard disk, as is their own data. The Columbia's screen display was also easier to read.

The hard-disk was arranged as a "dedicated" family workstation. The household finances, babysitting lists, and mailing and word-processing chores all have a home. Sherry, a former owner of a word-processing firm, now on an extended child-rearing leave of absence, seriously considers using the Columbia as part of a new freelance business venture. "A hard disk is so much tidier and easier to maintain. I can't remember how we did things without one," she says.

Meanwhile, the transportable Compaq has become a traveling companion. Steven takes it to his office because there aren't enough computers to go around. Back at home, the



"MY FOCUS HAS CHANGED. I USED TO GET EXCITED

BY NEW CHIPS. NOW I GET EXCITED ABOUT NEW WAYS TO ENHANCE PRODUCTIVITY AND CREATIVITY."

—EVAN SCHARF

Compaq ties into the office and various on-line data bases to help Steven get his job done. "At least when he works on Saturdays he stays at home now," says Sherry. "Having a computer for work and a computer for home use might seem frivolous to some, but we use both enough to make it worthwhile."

GEARING UP FOR SCHOOL

The need for new computers grows as the children grow. Marcia Klein and her two children, David (17) and Debby (19), were straining the limits of their Apple II plus computer. The children were vying for word-processing time, playing games, and programming. Marcia, meanwhile, was using the II plus to dial up New York University's mainframe to work on her doctorate in computer science.

When Debby entered Cornell University, it was obvious that the computer could not commute. So the Kleins bought Debby a brand new Macintosh under the special college offering. The Macintosh is a common sight in the Cornell classroom. Debby uses it for computer-science classes, word processing, and even in her math class where her professors often write software to facilitate equation solving, vector programs, etc. "We can't wait for summer break so we get a chance to use Debby's computer," says Marcia. "I'm already trying to figure out what we'll do for a third computer when David begins college next year. My husband has been trying to get near the computer to learn about it and can't—it's too crowded already."

THANKS FOR THE MEMORY

Tobias Round, age 13, got a VIC-20 for Christmas in 1983. With its 5K memory, Tobias made the most of it for two years and then began telling his father about the wonderful things he had done on a friend's Commo-

OF THOSE PLANNING TO BUY A SECOND COMPUTER:

18% would buy Commodore

33% would buy Apple

36% would buy IBM

Link Resources



"BAD
ENOUGH
YOU'VE GOT
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ONE

COMPUTER'S SET OF
COMMANDS. I NEEDED
THE SAME MACHINE
AT HOME AS I HAD AT
THE OFFICE."

—LESTER RASKIN

dore 64. Tobias knew he could write and save longer programs on the 64. He also knew the 64 had more software available.

"I needed an expansion kit for the VIC-20 or a new machine," recalls Tobias. "I got a lot of use out of the VIC-20, but I could see doing word processing and writing longer programs on the 64. It's pretty apparent when you read magazines and software catalogs that Commodore is not really supporting the VIC-20 anymore," he says matter-of-factly. (Editor's note: FAMILY COMPUTING publishes VIC-20 programs every month.)

Tobias uses his new Commodore to help him with his schoolwork, to enter programs from magazines, and to write his own programs. He is showing his gratitude to his father (a professional photographer) by helping computerize his records. "The VIC certainly wouldn't let me write a BASIC program as long as the ones I'll write for Dad," reports Tobias.

CHASING TECHNOLOGY

Some people are just attracted to new technologies. Bob Umlas, a technical consultant with CBS in New York, has a passion for new computers. "You might say I wanted to be the first kid on my block," jokes Bob, his Macintosh in hand.

Bob had an Osborne computer and used it extensively. But when Osborne entered Chapter 11 of the federal bankruptcy law last year, "I saw the writing on the wall," he says. Osborne, which made a transportable CPM computer, was seriously hurt by the incident. The company has since reorganized and is now selling a computer called the Vixen.

"The Macintosh was very new, state-of-the-art," recalls Bob. "When I first saw a demo I was blown away. It's almost a year later and I'm still wowed by what it can do." After a long day with large computers at the

office, Bob comes home and relaxes with his Macintosh. Most recently he's been listening to his own rendition of Joplin's "Maple Leaf Rag," painstakingly entered into the Mac.

Evan Scharf of Boulder, Colorado, has also been swept along by the fast changes in computer technology, and transformed himself from a personal computer hobbyist into a computer professional. "In 1977 I got an Apple II, which is now a collector's item," says Evan. "I was a technology dabbler. When I got my Apple there

"IF IT AIN'T BROKE, DON'T FIX IT"

In interviewing "upgraders," I discovered many people who have strong reasons to stick with what they have. Their computers represent sizable investments of money and hours of work. These people are reluctant to toss aside a machine they know and love for more power and pizzazz.

Lester Block, of New York, for instance, has had his Atari 800 for over two years. He's written games, an assembler, and his own data base. "We might need to buy a second computer because my daughters and my wife say I don't give anyone else around here a chance," jokes Lester. "But, for now, I am very happy with my Atari."

"Sure, a more powerful computer would marginally increase my capabilities," he admits. "But it's essentially a price/performance issue. I know my machine inside-out and have hundreds of hours invested in it. Sometimes I think I might like to try and write some business software." In that case, Lester says he would purchase an IBM, since that's what business people use. But until then, he'll continue to use the Atari as a devoted hobbyist.

weren't even disk drives available!"

In five years, Evan has changed computers a number of times. "First I upgraded the Apple to a II plus by swapping ROM chips and adding a disk drive. I bought one of the first copies of VisiCalc and started doing financial planning and projections. It caused a real uproar at the minicomputer company I worked for. Imagine, doing real work on a 'toy computer!'"

Next Evan bought an IBM PC. He says the PC gave him more memory, greater processing power, and a wider selection of business and productivity software. "Lotus 1-2-3 was a phenomenal improvement over VisiCalc," he says enthusiastically. He's also bought an Apple IIc to help him develop his "labor of love," an astronomy package called Telstar.

"My focus has changed," remarks Evan. "I used to get excited by new chips. Now I get excited about new ways to enhance productivity and creativity."

NINE LIVES?

Thinking of computers as old clothes is great for all those people who benefit from the hand-me-downs. The first people to require the increased power from a more expensive computer will be the ones who use it for business or for school. As they upgrade, the "ripple" effect lets others try computers too.

Gary Straub sold his Timex system to a woman and her son who were just learning about computers. Anthony Maglioglio gave his CoCo to his brother-in-law. My father gave his Atari to my kids. Computers may not have nine lives, but they obviously have more than one. As more and more people make the decision to upgrade, more and more people will be introduced to computers. ☐

Robin Raskin is a contributing editor to FAMILY COMPUTING.

the PROGRAMMER



ILLUSTRATION BY BARTON STABLER



J U N E



TIPS TO THE TYPIST

Page 50

How to type in
FAMILY COMPUTING'S
programs.

BEGINNER PROGRAM

Page 51

Look!
Up in the sky!
It's the
Airplane Message
service!

GRAPHICS PROGRAM

Page 54

Let *Patterns*
embroider your screen
with
brilliant color
and
imaginative forms.

PUZZLE

Page 57

Can you solve
the mystery
of the
Planet of the Eggs?
Figure it out
before midnight, or the
yolk's on you!

PROGRAMMING P.S. Page 62 Corrections to previous months' programs, and to "Helpful Hints."

ILLUSTRATION BY JIM CHERRY III

Cherry

TIPS TO THE TYPIST

Typing in FAMILY COMPUTING's programs is a great way to become familiar with your computer and get some free software "to boot." But it's frustrating to type in a long program only to find it doesn't work as it should. When this happens, simple typing errors are most often the cause. So to help you gain greatest value from the time you spend computing with us, we've put together some tips on how to avoid typing errors—and what to do if a program doesn't run right. Read them carefully and you'll be up and running in no time!

SOME GENERAL RULES

1. Do set up your computer in a well-lighted, comfortable location, and prop the magazine up so that you don't have to strain to read the printed listing.

2. Do read instructions and program headings carefully. Make sure your computer has enough memory, the right version of BASIC, and the appropriate peripherals (joysticks, printers, disk drives, etc.) for a program.

3. Don't let fatigue and boredom contribute to inaccuracy. If you're new to programming, try typing in shorter programs first. Type in a longer program in easy stages, saving each installment as you go.

4. Until you are fairly familiar with BASIC, **do** assume that every word, number, letter, space, and punctuation mark in a program listing must be copied accurately if the program is to function as intended.

5. Do watch out for potential trouble spots. About 90 percent of all typing errors occur in DATA statements: long lines filled with numbers or incomprehensible secret codes. If possible, have someone else read DATA to you as you type, and help you proofread it if you have trouble later on. Proofreading from a printout is best.

6. Do be aware that program listings printed in FAMILY COMPUTING sometimes differ from what you will see on your computer's screen or in printouts you produce at home. Our program listings are printed 54 characters wide. Thus, a single BASIC program "line" (sometimes called a "logical line") may appear as several lines in our listing. If you are typing along and reach the right margin of the printed listing, don't press RETURN or ENTER until you've checked to see if the program "line" you're typing really ends there. The way to tell is to check if the line following begins with a multiple of 10 that follows in sequence from the previous logical line. REM statements are the exception and typing them in is optional.

Several computers (ADAM, Apple, Atari, and TI) format BASIC programs according to unique rules of their own. Don't let this throw you—just type in the listing exactly as printed in the magazine and your computer is guaranteed to accept it, even though it may end up looking a little different on your screen.

7. One foolproof way to correct an error in a BASIC program line is to type the line in again from the beginning, and press RETURN or ENTER to set it in place of the old one in your computer's memory.

WHICH PROGRAMS WILL RUN ON MY COMPUTER?

Unless a program heading indicates otherwise, programs will run on any version of the computer specified, with the following exceptions:

- Apple programs run under AppleSoft (not Integer) BASIC on the Apple II (with language card), II plus, IIe, and IIc. The Macintosh is not supported as of this writing.
- Our Atari programs may in some cases be incompatible with the Atari 1200XL.
- IBM PC owners may occasionally require a Color Graphics Adapter to run our graphics programs.
- TI programs not marked "w/TI Extended BASIC" should be run under standard (console) TI BASIC.
- TRS-80 Model III programs will run on the Model 4 in Model III mode.

DEBUGGING HINTS

Sometimes even the most careful typist makes a mistake. Don't expect your program to run right off the bat. If you have problems, remain patient and follow these general instructions for a probable quick fix.

LIST the program in screen-size chunks (check your manual for instructions on how to LIST parts of a program). Even better, if you have a printer, get a printout. Compare what you've typed in—letter by letter—to the published program. Make sure that you haven't typed the numeral 0 (which is slashed in our listings) for the letter O (which isn't), swapped a small letter "l" for the numeral one, dropped or mixed up some punctuation, switched uppercase text for lowercase or vice versa (particularly in DATA statements or within quotes), or miscounted the characters (and/or spaces) between a pair of quotes. Get someone to help you if possible.

Check your DATA statements—then check them again. Mistakes in DATA statements are the single most common cause of program failures. Bad DATA can cause a program to malfunction at any point, which can be misleading.

WHAT TO DO WHEN YOU'VE DONE IT ALL

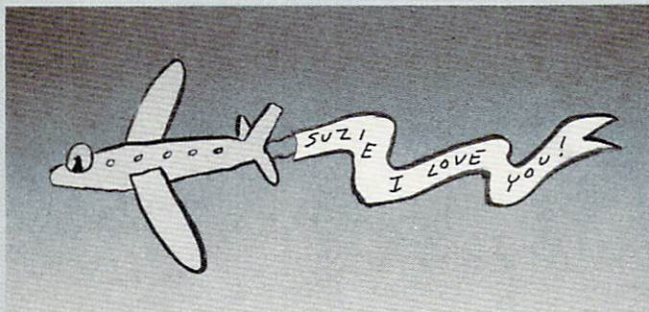
We're proud of our programs, and we want you to enjoy them as much as we enjoy writing them. If you just can't figure out what's wrong with a program, we'd like to help. But we can't if you don't provide us with important information. When you write us (no telephone calls, please), indicate:

- Which program you're having trouble with.
- Which type of computer you own, the type of BASIC you are using, how much RAM your computer has, and what DOS and peripherals you're using, if any.
- What error messages your computer has given you.
- Your name, address, and telephone number.

If possible, please enclose a printout. Address all correspondence to Programming P.S., FAMILY COMPUTING, 730 Broadway, New York, NY 10003.

AIRPLANE MESSAGE SERVICE

BY JOEY LATIMER



I'm sure most of you have been at a ball game or at the beach, and seen an airplane zip by, pulling a message banner. The idea is that if the plane flies by often enough, everyone in the crowd is sure to see the message at least once.

With that in mind, this month's beginner program is for those of you who have a hard time synchronizing communications with other members of your family. It's called *Airplane Message*, and parents—it is guaranteed to get through to kids!

PROGRAM NOTES

Airplane Message demonstrates "horizontal scrolling"—a technique for moving images across a computer screen. To understand how scrolling works, visualize a long

strip of parchment wrapped around two rollers. If you hold the rollers some distance apart and turn them, anything printed on the paper will move by as the paper unwinds off one roller and winds onto the other.

In computer terms, scrolling involves setting up the equivalent of a strip of parchment (a long string of characters containing a message, bounded at each end by a group of blank spaces) and printing incremental sections of this string on the screen so that the message seems to move from one side to the other.

Let's look at how *Airplane Message* sets up its "parchment." First, you are asked to type in a brief message. Type in your message (no commas) and

press RETURN or ENTER. The letters you type are taken in by an INPUT statement, and placed in a string variable, MS.

Next, the airplane shape (a "+" sign), the tow rope (three dashes), and the banner borders ("<" and ">") are added to your message. This forms a new string called PS that looks like this:

+---<YOUR MESSAGE>

Then a number of blank spaces equal to the number of letters that can fit on one line of your computer's screen are added to each end of PS. For example, if your screen is 32 characters wide, PS ends up looking something like this:

(32 spaces)+---<YOUR MESSAGE>(32 spaces)

Now PS is ready for scrolling. A variable called T is set to point to the first character of PS. With MIDS (Atari BASIC uses subscripts to denote sections of a string), the program selects a screen-wide section of PS starting at point T, and prints this section on a predetermined screen line. Then the value of T is increased to 2. The pro-

gram selects a new section of PS starting at the second character, and prints this on top of the old one. By repeating the process, each time selecting and printing a substring from a little further down the line, the airplane message is made to move across your screen.

If you want a challenge, see if you can figure out how to do the following.

- Modify *Airplane Message* so that the plane flies from left to right, instead of right to left (easy).

- Change the program so that the plane flies on a diagonal, or up and down (harder).

- Use the scrolling technique to make a program that works like a movie marquee: one that makes a message move all the way around the borders of your screen (very hard!).

If you devise a good enhancement of one of our beginner programs, we might mention it in a future issue. Send a printout of your program (no tapes or disks, please) to:

Beginner Programs
FAMILY COMPUTING
730 Broadway
New York, NY 10003

Apple/Airplane Message

```

10 HOME
20 PRINT TAB(3);"+---<THE AIRPLANE MESSAGE SERVICE>"
30 PRINT
40 PRINT "TYPE IN A BRIEF MESSAGE,"
50 PRINT "THEN PRESS <RETURN>."
60 PRINT
70 INPUT " ";MS
80 IF LEN(MS) < 170 THEN 110
90 PRINT "YOUR MESSAGE IS TOO LONG. TRY AGAIN."
100 GOTO 30
110 HOME
120 PS = "+---<" + MS + ">"
130 FOR I = 1 TO 40
140 PS = " " + PS + " "
150 NEXT I
160 PRINT "PRESS ANY KEY TO ENTER ANOTHER MESSAGE."
170 V = INT(RND(1)*22)+2
180 T = 1
190 VTAB V
200 PRINT MIDS(PS,T,40);
209 REM --SEE IF A KEY HAS BEEN PRESSED--
210 IF PEEK(-16384) < 128 THEN 240
219 REM --PREPARE FOR MORE INPUT--
220 POKE -16368,0
230 GOTO 10
240 IF T = LEN(PS)-39 THEN 290
250 T = T+1
260 FOR D = 1 TO 50
270 NEXT D

```

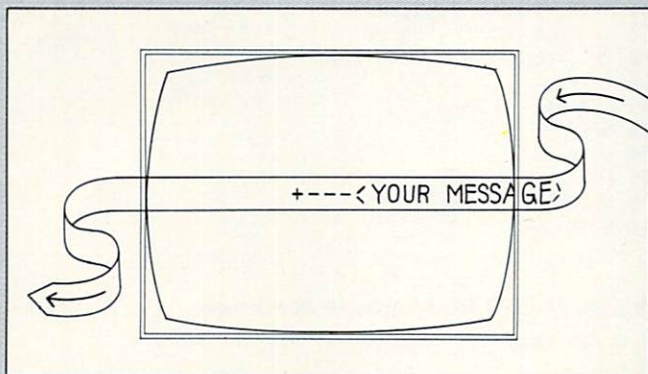
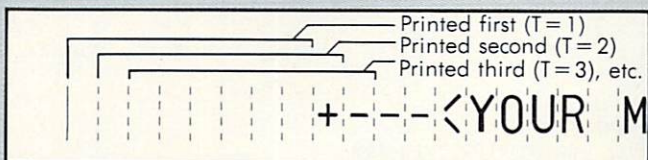


DIAGRAM BY PAT LYONS



BEGINNER PROGRAM

```
280 GOTO 190
290 FOR D = 1 TO 1000
300 NEXT D
310 GOTO 170
```

Atari/Airplane Message

```
10 DIM PS(214),MS(128)
20 PS=""
30 FOR I=2 TO 40
40 PS(LEN(PS)+1)=""
50 NEXT I
60 PRINT CHR$(125);
70 PRINT " +---<THE AIRPLANE MESSAGE SERVICE>"
80 PRINT
90 PRINT "TYPE IN A BRIEF MESSAGE,"
100 PRINT "THEN PRESS <RETURN>."
110 PRINT
120 INPUT MS
130 PRINT CHR$(125);
140 PS(41)="+---<"
150 PS(46)=MS
160 PS(LEN(PS)+1)=""
170 PS(LEN(PS)+1)=PS(1,40)
179 REM --TURN OFF THE CURSOR--
180 POKE 752,1
189 REM --GET READY TO READ KEYBOARD--
190 POKE 764,255
200 POSITION 0,0
210 PRINT "PRESS ANY KEY TO ENTER ANOTHER MESSAGE."
220 V=INT(RND(0)*22)+1
230 T=1
240 POSITION 0,V:PRINT PS(T,T+39);
249 REM --SEE IF A KEY HAS BEEN PRESSED--
250 IF PEEK(764)=255 THEN 290
259 REM --GET READY FOR MORE INPUT--
260 POKE 764,255
269 REM --TURN CURSOR BACK ON--
270 POKE 752,0
280 GOTO 60
290 IF T=LEN(PS)-39 THEN 340
300 T=T+1
310 FOR D=1 TO 5
320 NEXT D
330 GOTO 240
340 FOR D=1 TO 250
350 NEXT D
360 GOTO 220
```

Commodore 64/Airplane Message

```
10 PRINT CHR$(147);
20 PRINT TAB(3);"+---<THE AIRPLANE MESSAGE SERVICE>"
30 PRINT
40 PRINT "TYPE IN A BRIEF MESSAGE,"
50 PRINT "THEN PRESS <RETURN>."
60 PRINT
70 INPUT MS
80 PRINT CHR$(147);
90 PS="+---<"+MS+">"
100 FOR I=1 TO 40
110 PS=" "+PS+" "
120 NEXT I
130 PRINT "PRESS ANY KEY TO ENTER ANOTHER MESSAGE."
140 V=INT(RND(1)*23)
150 T=1
160 PRINT CHR$(19);
170 POKE 214,V:PRINT
180 PRINT MID$(PS,T,40);
190 GET K$
200 IF K$<>"" THEN 10
210 IF T=LEN(PS)-39 THEN 260
220 T=T+1
230 FOR D=1 TO 50
240 NEXT D
250 GOTO 170
260 FOR D=1 TO 1000
270 NEXT D
280 GOTO 140
```

Done

IBM PCs/Airplane Message

```
9 REM --CHANGE LINE 10 TO WL=80 FOR 80-COLUMN SCREEN--
10 WL=40
20 WIDTH WL:KEY OFF
30 CLS
40 PRINT TAB((WL/2)-17);"+---<THE AIRPLANE MESSAGE SER
VICE>"
50 PRINT
60 PRINT "TYPE IN A BRIEF MESSAGE,"
70 PRINT "THEN PRESS <ENTER>."
80 PRINT
90 LINE INPUT MS
100 IF LEN(MS)<250-WL*2 THEN 130
110 PRINT "YOUR MESSAGE IS TOO LONG. TRY AGAIN."
120 GOTO 50
130 CLS
140 PS=STRING$(WL,32)+"+---<"+MS+">"+STRING$(WL,32)
150 PRINT TAB((WL/2)-19);"PRESS ANY KEY TO ENTER ANOTH
ER MESSAGE."
160 V=INT(RND*22)+2
170 T=1
180 LOCATE V,1:PRINT MID$(PS,T,WL);
190 IF INKEY$<>"" THEN 30
200 IF T=LEN(PS)-(WL-1) THEN 230
210 T=T+1
220 GOTO 180
230 FOR D=1 TO 1000
240 NEXT D
250 GOTO 160
```

TRS-80 Color Computer/Airplane Message

```
10 CLEAR 1000
20 CLS
30 PRINT " +---<AIRPLANE MESSAGE SERVICE>"
40 PRINT
50 PRINT "TYPE IN A BRIEF MESSAGE,"
60 PRINT "THEN PRESS <ENTER>."
70 PRINT
80 INPUT MS
90 IF LEN(MS)<186 THEN 130
100 PRINT "YOUR MESSAGE IS TOO LONG."
110 PRINT "TRY AGAIN."
120 GOTO 40
130 CLS
140 PS="+---<"+MS+">"
150 FOR I=1 TO 32
160 PS=" "+PS+" "
170 NEXT I
180 PRINT TAB(5);"PRESS ANY KEY TO ENTER"
190 PRINT TAB(8);"ANOTHER MESSAGE."
200 V=RND(13)*32+32
210 T=1
220 PRINT@V,MID$(PS,T,32);
230 IF INKEY$<>"" THEN 20
240 IF T=LEN(PS)-31 THEN 290
250 T=T+1
260 FOR D=1 TO 25
270 NEXT D
280 GOTO 220
290 FOR D=1 TO 500
300 NEXT D
310 GOTO 200
```

TRS-80 Model III/Airplane Message

```
10 CLEAR 1000
20 CLS
30 PRINT TAB(16);"+---<THE AIRPLANE MESSAGE SERVICE>"
40 PRINT
50 PRINT "TYPE IN A BRIEF MESSAGE, THEN PRESS <ENTER>."
60 PRINT
70 INPUT MS
80 IF LEN(MS)<122 THEN 110
90 PRINT "YOUR MESSAGE IS TOO LONG. TRY AGAIN."
```



```

100 GOTO 40
110 CLS
120 PS=STRING$(64,32)+"+---<"+"M$+">"+STRING$(64,32)
130 PRINT TAB(12);"PRESS ANY KEY TO ENTER ANOTHER MESSAGE."
140 V=RND(14)*64
150 T=1
160 PRINTV,MID$(PS,T,64);
170 IF INKEY$<>" " THEN 20
180 IF T=LEN(PS)-63 THEN 230
190 T=T+1
200 FOR D=1 TO 5
210 NEXT D
220 GOTO 160
230 FOR D=1 TO 500
240 NEXT D
250 GOTO 140

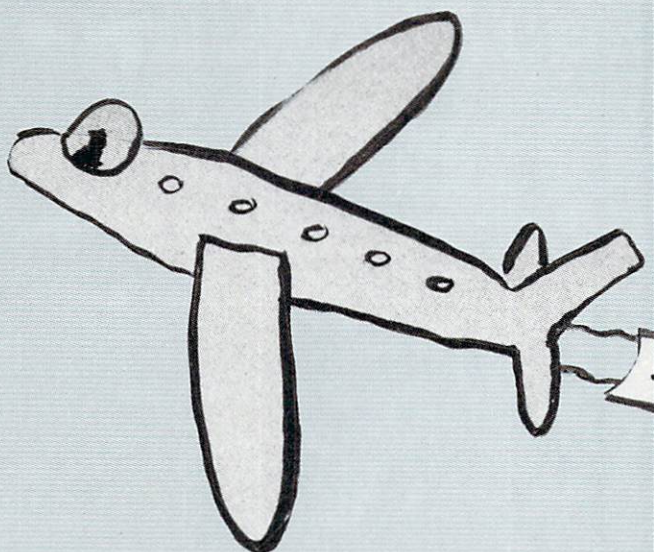
```

VIC-20/Airplane Message

```

10 PRINT CHR$(147);
20 PRINT "+---<AIRPLANE MESSAGE>"
30 PRINT
40 PRINT "TYPE IN A BRIEF"
50 PRINT "MESSAGE, THEN"
60 PRINT "PRESS <RETURN>."
70 PRINT
80 INPUT M$
90 PRINT CHR$(147);
100 PS="+---<"+"M$+">"+
110 FOR I=1 TO 22
120 PS=" "+PS+" "
130 NEXT I
140 PRINT "PRESS ANY KEY TO"
150 PRINT "ENTER ANOTHER MESSAGE."
160 V=INT(RND(1)*20)+1
170 T=1
180 PRINT CHR$(19);
190 POKE 214,V:PRINT
200 PRINT MID$(PS,T,22);
210 GET K$
220 IF K$<>" " THEN 10
230 IF T=LEN(PS)-21 THEN 280
240 T=T+1
250 FOR D=1 TO 50
260 NEXT D
270 GOTO 190
280 FOR D=1 TO 1000
290 NEXT D
300 GOTO 160

```



SOLUTION TO SCRAMBLED EGGS

over the audience. stops herself as a hush falls scrambled. . . . "Meg and my absolute favorite, ally consists of toast, coffee, form of nourishment that us- that?" Meg replies, "A meal. A fast?" a Nezod asks, "What's breakfast in bed, 'Break- few simple pleasures such as much of the time enjoying a she probably will spend cations. Meg explains that how her kind spend their va- zed from the audience asks replies, "On vacation!" A Ne- where she's going next, she them, and when they ask her city. Grateful, she thanks sent her with a key to their come to their senses and pre- ranges the eggs, the Nezods

Once Meg correctly re- be as shown at left. Therefore, one solution would correct number of eggs (7). the only one containing the

1	6	5
8	4	0
3	2	7

Scrambled Eggs is a twist on the classic "magic square" puzzle. To achieve a magic square, all rows, columns, and diagonals must add up to the same number. In this case, the magic number is 12. (Look carefully at the spelling of the word Nezod, and re- member that the society grows in reverse! Consider too that eggs are typically packed a dozen to a carton. And remember that destruc- tion occurs at midnight!) The upper left-hand plot is

BONUS PROGRAM

This second part of the program is a magic-square construction set! Move the cursor to any square and press RE- TURN or ENTER. You'll be asked, VALUE FOR THIS SQUARE? Type in a number (positive integers only) and press RE- TURN or ENTER. Not only will the number be placed in that square, but the sums of all the rows, columns, and diagonals will appear around the borders of the grid. It'll then be easy for you to experiment with different val- ues in different squares, try- ing to get all the rows, col- umns, and diagonals to add up to the same amount. Or, you can use the grid as a minispreadsheet! It'll give you totals across and down for up to three columns of up to three items each.

Hidden in the Scrambled Eggs program is a second one that you can use after, or in- stead of, solving the puzzle. When you have moved the eggs into their correct ar- rangement, after the message CORRECT ARRANGEMENT! YOU SAVED THE NEZODS! appears on the screen, the screen clears and a new three-by-three grid is drawn, with zeroes in all the squares. You can go di- rectly to this part of the pro- gram, without solving the puzzle. Remove REM from line 90 of the IBM versions, line 100 of the Atari version, or line 110 of the other versions. Line 90 of the IBM version will read

PATTERNS

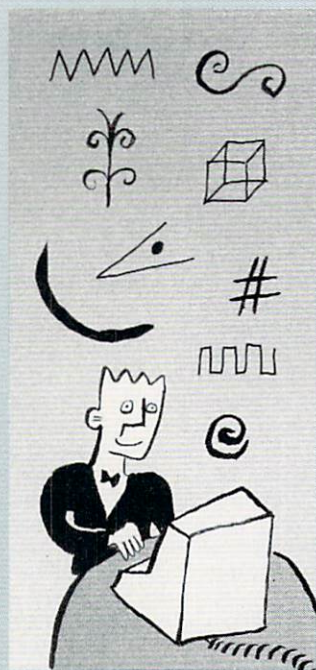
JOEY LATIMER

Have you ever wanted to make an Indian blanket, create op art, or just plain experiment with your computer's graphic capabilities?

Patterns lets you draw a simple block pattern in low-resolution graphics. It then multiplies this pattern dynamically over and over, making it play against itself in fascinating ways. As the process of repetition continues, you can vary the colors and choose whether patterns overprint or erase each other when they collide.

To use *Patterns*, type in the program and SAVE it to disk or tape. Set your computer to all uppercase letters before typing RUN (except ADAM). *Patterns* will begin by presenting you with a drawing screen, bordered at the bottom by an instruction window. The drawing screen will be blank except for a cursor at the center. Design an initial pattern (which may occupy up to 128 squares) by moving the cursor with the "U" (diagonal up left); "I" (straight up); "O" (diagonal up right); "J" (left); "L" (right); "M" (diagonal down left); "N" (straight down); and "." (diagonal down right) keys. *Patterns* does not let you selectively erase parts of a design, but you can erase the entire drawing screen and start over by pressing the "E" key.

When you're finished designing your pattern, press "P" to start the repetition process. Command keys that control the process include "W" for Wait, which will freeze the screen for



study; "C" for Color, to change the color the machine currently is drawing in (in the TRS-80 Model III version, the "C" key changes the graphics character currently being used to draw the pattern); "E" for Erase, to clear the screen and prepare a new design; and "Q" for Quit, in order to terminate program execution and return to BASIC. Finally, the "O" key toggles the overprint feature on and off. When overprint is turned on (as it is at the beginning of the repetition process), patterns simply print over one another when they collide. By pressing the "O" key, you can change this rule so that the area where two patterns overlap is erased. Pressing the "O" key again turns the overprint feature back on. Use of this feature can create waves of movement within the overall design as patterns interact to create unoccupied space on the screen.

ADAM/Patterns

```
9 REM --MAKE SURE <LOCK> KEY IS UP--
10 LOMEM: 29000
20 DIM c(127),r(127)
30 FOR i = 28000 TO 28005:READ a:POKE i,a:NEXT i
40 p = 0:x = 19:y = 19:ko = 15
50 HOME:GR
60 VTAB 21
70 PRINT " Direction keys:";TAB(21);"u i o"
80 PRINT " <e>=erase";TAB(21);"j l"
```

```
90 PRINT " <p>=patterns";TAB(21);"m , ."
100 COLOR= 15:PLOT x,y
110 GET k$
120 IF p > 0 AND k$ = "p" THEN p = p-1:GOTO 190
130 IF k$ = "e" THEN 40
140 cx = (k$ = "o" OR k$ = "l" OR k$ = ".")-(k$ = "u" OR k$ = "j" OR k$ = "m")
150 cy = (k$ = "m" OR k$ = ", OR k$ = ".")-(k$ = "u" OR k$ = "i" OR k$ = "o")
160 IF cx = 0 AND cy = 0 THEN 110
170 c(p) = cx:r(p) = cy:x = x+cx:y = y+cy:GOSUB 1000
180 PLOT x,y:IF p < 127 THEN p = p+1:GOTO 110
190 i = 0:f = 0
200 HOME:VTAB 21
210 PRINT "<w>=wait";TAB(22);"<e>=erase"
220 PRINT "<c>=change color";TAB(22);"<q>=quit"
230 PRINT TAB(7);"<o>=overprint mode"
239 REM --"CALL 28000" CLEARS KEYPRESS REGISTER--
240 CALL 28000
250 k = PEEK(64885):IF k > 0 THEN CALL 28000
260 IF k = 113 THEN TEXT:HOME:END
270 IF k = 101 THEN 40
280 IF k = 99 THEN ko = ko+1-15*(ko = 15):COLOR= ko
290 IF k = 111 THEN f = NOT f
300 IF k <> 119 THEN 340
310 HOME:VTAB 22
320 PRINT TAB(4);"Press any key to continue."
330 GET k$:GOTO 200
340 x = x+c(i):y = y+r(i):GOSUB 1000
350 IF SCRN(x,y) = 0 OR NOT f THEN PLOT x,y:GOTO 370
360 COLOR= 0:PLOT x,y:COLOR= ko
370 i = i+1:IF i = p+1 THEN i = 0
380 GOTO 250
1000 x = x+40*((x = -1)-(x = 40))
1010 y = y+40*((y = -1)-(y = 40)):RETURN
2000 DATA 62,0,50,117,253,201
```

Apple/Patterns

```
10 DIM C(127),R(127)
20 P = 0:X = 19:Y = 19:K0 = 15
30 HOME:GR
40 VTAB 21:PRINT TAB(18);"U I O <E>=ERASE"
50 PRINT "DIRECTION KEYS: J L"
60 PRINT TAB(18);"M , <P>=PATTERNS";
70 COLOR= 15:PLOT X,Y
80 GOSUB 1000
90 IF P > 0 AND K = 80 THEN P = P-1:GOTO 160
100 IF K = 69 THEN 20
110 CX = (K = 79 OR K = 76 OR K = 46)-(K = 85 OR K = 74 OR K = 77)
120 CY = (K = 77 OR K = 44 OR K = 46)-(K = 85 OR K = 73 OR K = 79)
130 IF CX = 0 AND CY = 0 THEN 80
140 C(P) = CX:R(P) = CY:X = X+CX:Y = Y+CY:GOSUB 2000
150 PLOT X,Y:IF P < 127 THEN P = P+1:GOTO 80
160 I = 0:F = 0
170 HOME:VTAB 21
180 PRINT "<C>=CHANGE COLOR";TAB(31);"<E>=ERASE"
190 PRINT "<W>=WAIT";TAB(31);"<Q>=QUIT"
200 PRINT TAB(12);"<O>=OVERPRINT MODE"
210 POKE -16368,0
220 K = PEEK(-16384)-128:IF K >= 0 THEN POKE -16368,0
230 IF K = 81 THEN TEXT:HOME:END
240 IF K = 69 THEN 20
250 IF K = 67 THEN K0 = K0+1-15*(K0 = 15):COLOR= K0
260 IF K = 79 THEN F = NOT F
270 IF K <> 87 THEN 310
280 HOME:VTAB 22
290 PRINT TAB(8);"PRESS ANY KEY TO CONTINUE."
300 GOSUB 1000:GOTO 170
310 X = X+C(I):Y = Y+R(I):GOSUB 2000
320 IF SCRN(X,Y) = 0 OR NOT F THEN PLOT X,Y:GOTO 340
330 COLOR= 0:PLOT X,Y:COLOR= K0
340 I = I+1:IF I = P+1 THEN I = 0
350 GOTO 220
1000 POKE -16368,0
1010 K = PEEK(-16384)-128:IF K < 0 THEN 1010
```



```

1020 RETURN
2000 X = X+40*((X = -1)-(X = 40))
2010 Y = Y+40*((Y = -1)-(Y = 40)):RETURN

```

Atari/Patterns

```

10 DIM C(127),R(127)
20 GRAPHICS 3:POKE 752,1:POKE 82,0
29 REM --LINES 30-60 KEEP TEXT WINDOW BLACK--
30 FOR I=1536 TO 1553:READ A:POKE I,A:NEXT I
40 DL=PEEK(560)+256*PEEK(561):A=PEEK(559)
50 POKE 559,0:POKE DL+24,136
60 POKE 512,0:POKE 513,6:POKE 54286,192:POKE 559,4
70 SETCOLOR 0,1,7:SETCOLOR 1,2,7:SETCOLOR 2,3,7
80 P=0:X=19:Y=8:K=1
90 PRINT #6;CHR$(125):PRINT CHR$(125);:POKE 657,17
100 PRINT "U I O <E>=ERASE"
110 PRINT "DIRECTION KEYS: J L"
120 POKE 657,17:PRINT "M , . <P>=PATTERNS"
130 COLOR 1:PLOT X,Y
140 GOSUB 1000
150 IF P>0 AND K=10 THEN P=P-1:GOTO 220
160 IF K=42 THEN 70
170 CX=(K=8 OR K=0 OR K=34)-(K=11 OR K=1 OR K=37)
180 CY=(K=37 OR K=32 OR K=34)-(K=11 OR K=13 OR K=8)
190 IF CX=0 AND CY=0 THEN 140
200 C(P)=CX:R(P)=CY:X=X+CX:Y=Y+CY:GOSUB 2000
210 PLOT X,Y:IF P<127 THEN P=P+1:GOTO 140
220 I=0:F=0:NX=4
230 PRINT CHR$(125);
240 PRINT "<W>=WAIT";:POKE 657,30:PRINT "<E>=ERASE"
250 PRINT "<C>=CHANGE COLORS";:POKE 657,30:PRINT "<Q>=QUIT"
260 POKE 657,11:PRINT "<O>=OVERPRINT MODE"
270 POKE 764,255
280 K=PEEK(764):IF K<255 THEN POKE 764,255
290 IF K=47 THEN POKE 82,2:POKE 752,0:GRAPHICS 0:END
300 IF K=42 THEN 70
310 IF K=18 THEN K=K+1-3*(K=3):COLOR K:SETCOLOR K
-1,NX,7:NX=NX+1+3*(NX=9)-15*(NX=15)
320 IF K=8 THEN F= NOT F
330 IF K<>46 THEN 370
340 PRINT CHR$(125):POKE 657,8
350 PRINT "PRESS ANY KEY TO CONTINUE."
360 GOSUB 1000:GOTO 230
370 X=X+C(I):Y=Y+R(I):GOSUB 2000
380 LOCATE X,Y,C:IF C=0 OR F=0 THEN PLOT X,Y:GOTO 400
390 COLOR 0:PLOT X,Y:COLOR K
400 I=I+1-(P+1)*(I=P):GOTO 280
1000 POKE 764,255
1010 K=PEEK(764):IF K=255 THEN 1010
1020 RETURN
2000 X=X+40*((X=-1)-(X=40))
2010 Y=Y+40*((Y=-1)-(Y=40)):RETURN
3000 DATA 72,8,141,10,212,169,15,141,23
3010 DATA 208,169,0,141,24,208,40,104,64

```

Commodore 64/Patterns

```

10 DIM C(127),R(127):SB=1024:CB=55296
20 POKE 53280,0:POKE 53281,0
30 QS=" ":FOR A=1 TO 38:QS=QS+" ":NEXT A
40 P=0:X=19:Y=10:K=5
50 PRINT CHR$(147)
60 PRINT CHR$(19);:POKE 214,21:PRINT
70 PRINT TAB(17);"U I O <E>=ERASE"
80 PRINT "DRAWING KEYS: J L"
90 PRINT TAB(17);"M , . <P>=PATTERNS";
99 REM --PLACE CURSOR AT CENTER OF SCREEN--
100 POKE 1443,160:POKE 55715,5
110 GET K$:IF K$="" THEN 110
120 IF P>0 AND K$="P" THEN P=P-1:GOTO 200
130 IF K$="E" THEN 40
140 CX=(K$="U" OR K$="J" OR K$="M")-(K$="O" OR K$="L"
OR K$=".")
150 CY=(K$="U" OR K$="I" OR K$="O")-(K$="M" OR K$=","
OR K$=".")

```

```

160 IF CX=0 AND CY=0 THEN 110
170 C(P)=CX:R(P)=CY:X=X+CX:Y=Y+CY:GOSUB 1000
180 POKE SB+X+40*Y,160:POKE CB+X+40*Y,KO
190 IF P<127 THEN P=P+1:GOTO 110
200 I=0:F=0
210 PRINT CHR$(19);:POKE 214,21:PRINT
220 PRINT "<C>=CHANGE COLOR";LEFT$(QS,14);"<E>=ERASE"
230 PRINT "<W>=WAIT";LEFT$(QS,22);"<Q>=QUIT "
240 PRINT LEFT$(QS,10);"<O>=OVERPRINT MODE";LEFT$(QS,1
1);
250 GET K$
260 IF K$="Q" THEN SYS 770:END
270 IF K$="E" THEN 40
280 IF K$="C" THEN KO=K+1:IF KO=16 THEN KO=1
290 IF K$="O" THEN F=NOT F
300 IF K$<"W" THEN 350
310 PRINT CHR$(19);:POKE 214,21:PRINT:PRINT QS
320 PRINT " PRESS ANY KEY TO CONTINUE. "PR
INT QS;
330 GET K$:IF K$="" THEN 330
340 GOTO 210
350 X=X+C(I):Y=Y+R(I):GOSUB 1000
360 IF PEEK(SB+X+Y*40)=160 AND F THEN POKE SB+X+Y*40,3
2:GOTO 390
370 POKE SB+X+Y*40,160
380 POKE CB+X+Y*40,KO
390 I=I+1:IF I=P+1 THEN I=0
400 GOTO 250
1000 X=X+40*((X=40)-(X=-1))
1010 Y=Y+40*((Y=40)-(Y=-1)):RETURN

```

IBM PC w/Color Graphics Adapter & IBM PCjr/Patterns

```

10 WIDTH 40:KEY OFF:SCREEN 0,1
20 DIM C(127),R(127)
30 P=0:X=19:Y=12:K=15
40 CLS
50 LOCATE 22,17,0:COLOR 15:PRINT "U I O <E>=ERASE"
60 PRINT "DIRECTION KEYS: J L"
70 PRINT TAB(17);"M , . <P>=PATTERNS";
80 LOCATE Y,X:PRINT CHR$(219);
90 K$=INKEY$:IF K$="" THEN 90
100 IF P>0 AND K$="P" THEN P=P-1:GOTO 180
110 IF K$="E" THEN 30
120 CX=(K$="U" OR K$="J" OR K$="M")-(K$="O" OR K$="L"
OR K$=".")
130 CY=(K$="U" OR K$="I" OR K$="O")-(K$="M" OR K$=","
OR K$=".")
140 IF CX=0 AND CY=0 THEN 90
150 C(P)=CX:R(P)=CY:X=X+CX:Y=Y+CY:GOSUB 1000
160 LOCATE Y,X:PRINT CHR$(219);
170 IF P<127 THEN P=P+1:GOTO 90
180 I=0:F=0
190 LOCATE 22,1:COLOR 15:PRINT "<C>=CHANGE COLOR";SPC(
14);"<E>=ERASE"
200 PRINT "<W>=WAIT";SPC(22);"<Q>=QUIT"
210 PRINT TAB(12);"O=OVERPRINT MODE";SPC(10);
220 K$=INKEY$
230 IF K$="Q" THEN COLOR 7:CLS:END
240 IF K$="E" THEN 30
250 IF K$="C" THEN KO=K+1:IF KO=16 THEN KO=1
260 IF K$="O" THEN F=NOT F
270 IF K$<"W" THEN 320
280 LOCATE 22,1:PRINT SPC(39)
290 COLOR 15:PRINT TAB(7);"PRESS ANY KEY TO CONTINUE."
;SPC(5)
300 PRINT SPC(39);
310 K$=INKEY$:IF K$="" THEN 310 ELSE 190
320 X=X+C(I):Y=Y+R(I):GOSUB 1000
330 IF SCREEN(Y,X,1)<>0 AND F THEN COLOR 0 ELSE COLOR
KO
340 LOCATE Y,X:PRINT CHR$(219);
350 I=I+1:IF I=P+1 THEN I=0
360 GOTO 220
1000 X=X+40*((X=41)-(X=0))
1010 Y=Y+41*((Y=22)-(Y=0)):RETURN

```


GRAPHICS PROGRAM

TRS-80 Color Computer/Patterns

```

10 CLEAR 150
20 DIM C(127),R(127)
30 P=0:X=15:Y=6:K0=143
40 CLS(0)
50 PRINT@417," DIRECTION KEYS:";TAB(22);"U I O ";
60 PRINT@449," <E>=ERASE";TAB(22);"J L ";
70 PRINT@481," <P>=PATTERNS";TAB(22);"M . ";
80 PRINT@207,CHR$(143);
90 K$=INKEY$:IF K$="" THEN 90
100 IF P>0 AND K$="P" THEN P=P-1:GOTO 180
110 IF K$="E" THEN 30
120 CX=(K$="U" OR K$="J" OR K$="M")-(K$="O" OR K$="L" OR K$=".")
130 CY=(K$="U" OR K$="I" OR K$="O")-(K$="M" OR K$="J" OR K$=".")
140 IF CX=0 AND CY=0 THEN 90
150 C(P)=CX:R(P)=CY:X=X+CX:Y=Y+CY:GOSUB 1000
160 PRINT@X+Y*32,CHR$(143);
170 IF P<127 THEN P=P+1:GOTO 90
180 I=0:F=0
190 PRINT@417,"<W>=WAIT";TAB(21);"<E>=ERASE";
200 PRINT@449,"<C>=CHANGE COLOR";TAB(21);"<Q>=QUIT ";
210 PRINT@481,TAB(7);"<O>=OVERPRINT MODE";TAB(30);
220 K$=INKEY$
230 IF K$="Q" THEN CLS:END
240 IF K$="E" THEN 30
250 IF K$="C" THEN K0=K0+1:IF K0=271 THEN K0=143
260 IF K$="O" THEN F=NOT F
270 IF K$<>"W" THEN 320
280 PRINT@417,TAB(30);
290 PRINT@449,TAB(3);"PRESS ANY KEY TO CONTINUE. ";
300 PRINT@481,TAB(30);
310 K$=INKEY$:IF K$="" THEN 310 ELSE 190
320 X=X+C(I):Y=Y+R(I):GOSUB 1000
330 IF PEEK(1024+X+Y*32)>128 AND F THEN CH$=CHR$(128)
ELSE CH$=CHR$(K0)
340 PRINT@X+Y*32,CH$;
350 I=I+1:IF I=P+1 THEN I=0
360 GOTO 220
1000 X=X+31*((X=31)-(X=-1))
1010 Y=Y+13*((Y=13)-(Y=-1)):RETURN

```

TRS-80 Model III/Patterns

```

10 CLEAR 150
20 DIM C(127),R(127)
30 P=0:X=32:Y=6:CH=191
40 CLS
50 PRINT@861,"U I O <E>=ERASE"
60 PRINT@906,"DIRECTION KEYS: J L"
70 PRINT@989,"M . <P>=PATTERNS";
80 PRINT@416,CHR$(191);
90 K$=INKEY$:IF K$="" THEN 90
100 IF P>0 AND K$="P" THEN P=P-1:GOTO 180
110 IF K$="E" THEN 30
120 CX=(K$="U" OR K$="J" OR K$="M")-(K$="O" OR K$="L" OR K$=".")
130 CY=(K$="U" OR K$="I" OR K$="O")-(K$="M" OR K$="J" OR K$=".")
140 IF CX=0 AND CY=0 THEN 90
150 C(P)=CX:R(P)=CY:X=X+CX:Y=Y+CY:GOSUB 1000
160 PRINT@X+64*Y,CHR$(191);
170 IF P<127 THEN P=P+1:GOTO 90
180 I=0:F=0
190 PRINT@832,"<C>=CHANGE CHARACTER";TAB(28);"<W>=WAIT ";TAB(43);"<O>=OVERPRINT MODE"
200 PRINT@896,"<E>=ERASE";TAB(53);"<Q>=QUIT"
210 PRINT@960,TAB(63);
220 K$=INKEY$
230 IF K$="Q" THEN CLS:END
240 IF K$="E" THEN 30
250 IF K$="C" THEN CH=CH-1:IF CH=175 THEN CH=191
260 IF K$="O" THEN F=NOT F
270 IF K$<>"W" THEN 310

```

```

280 PRINT@832,TAB(63);
290 PRINT@896,TAB(19);"PRESS ANY KEY TO CONTINUE.";TAB(63);
300 K$=INKEY$:IF K$="" THEN 300 ELSE 190
310 X=X+C(I):Y=Y+R(I):GOSUB 1000
320 IF PEEK(15360+X+Y*64)>32 AND F THEN CH$=CHR$(32) ELSE CH$=CHR$(CH)
330 PRINT@X+Y*64,CH$;
340 I=I+1:IF I=P+1 THEN I=0
350 GOTO 220
1000 X=X+64*((X=64)-(X=-1))
1010 Y=Y+13*((Y=13)-(Y=-1)):RETURN

```

VIC-20/Patterns

```

10 DIM C(127),R(127):SB=7680:CB=38400
20 POKE 36879,8
30 Q$=" ":FOR A=2 TO 21:Q$=Q$+" ":NEXT A
40 P=0:X=10:Y=8:K0=5
50 PRINT CHR$(147)
60 PRINT CHR$(19);:POKE 214,19:PRINT
70 PRINT "DIRECTION KEYS: U I O"
80 PRINT "<E>=ERASE J L"
90 PRINT "<P>=PATTERNS M .";
99 REM --PLACE CURSOR AT CENTER OF SCREEN--
100 POKE 7866,160:POKE 38586,5
110 GET K$:IF K$="" THEN 110
120 IF P>0 AND K$="P" THEN P=P-1:GOTO 200
130 IF K$="E" THEN 40
140 CX=(K$="U" OR K$="J" OR K$="M")-(K$="O" OR K$="L" OR K$=".")
150 CY=(K$="U" OR K$="I" OR K$="O")-(K$="M" OR K$="J" OR K$=".")
160 IF CX=0 AND CY=0 THEN 110
170 C(P)=CX:R(P)=CY:X=X+CX:Y=Y+CY:GOSUB 1000
180 POKE SB+X+22*Y,160:POKE CB+X+22*Y,K0
190 IF P<127 THEN P=P+1:GOTO 110
200 I=0:F=0
210 PRINT CHR$(19);:POKE 214,19:PRINT
220 PRINT " <C>=COLOR <E>=ERASE "
230 PRINT " <W>=WAIT <Q>=QUIT "
240 PRINT " <O>=OVERPRINT MODE ";
250 GET K$
260 IF K$="Q" THEN POKE 36879,27:PRINT CHR$(147);:END
270 IF K$="E" THEN 40
280 IF K$="C" THEN K0=K0+1:IF K0=7 THEN K0=1
290 IF K$="O" THEN F=NOT F
300 IF K$<>"W" THEN 350
310 PRINT CHR$(19);:POKE 214,19:PRINT:PRINT " PRES
S ANY KEY "
320 PRINT " TO CONTINUE. ":PRINT Q$;
330 GET K$:IF K$="" THEN 330
340 GOTO 210
350 X=X+C(I):Y=Y+R(I):GOSUB 1000
360 IF PEEK(SB+X+Y*22)=160 AND F THEN POKE SB+X+Y*22,3
2:GOTO 390
370 POKE SB+X+Y*22,160
380 POKE CB+X+Y*22,K0
390 I=I+1:IF I=P+1 THEN I=0
400 GOTO 250
1000 X=X+22*((X=22)-(X=-1))
1010 Y=Y+20*((Y=20)-(Y=-1)):RETURN

```


PLANET OF THE EGGS

A Hard-Boiled Tale of Sabotage and Suspense

PUZZLE BY PETER FAVARO AND SARAH KORTUM

PROGRAM BY STEVEN C.M. CHEN

If you're not a puzzle fan, you can still have fun with this program. See "Bonus Program" in the Solution to Scrambled Eggs, page 53. But don't read it unless you're sure you don't want to try the puzzle.

Exactly three minutes after the landing pod touched the surface of planet OVR-EZ, explorer Meg S. Benedict stepped off the ladder and listened to the air lock close with a soft whoooooosh. She shut her eyes and inhaled a long, deep breath, exhausted from a week of strenuous exploratory work, which had included visits to three moons (two natural, one artificial), six asteroids, and a self-sufficient space colony. This was her last stop before a much-needed vacation.

As Meg surveyed the landscape, she realized that everything was orderly and uniform. The trees were identical—Meg knew, without counting, that each contained the same number of leaves. Nothing was out of balance. If there was a black circular design on the left side of a dwelling, it was complemented on the right side by a white circle. When a light was turned on in one window, a light was turned off in another. Even the nine plots of land in the middle of the landscape were arranged in a perfectly symmetrical, three-by-three grid.

This community was a refreshing change from the



Karmian society Meg had just visited, where the greeting ritual consisted of dipping new arrivals head-first into pools of green mud as a sign of hospital-

ity. Only one thing seemed out of order on OVR-EZ: some eggs were scattered about the nine plots in apparent disarray.

Meg headed toward a

nearby foodstation and was taken aback by her first sight of the inhabitants. One creature was pouring large amounts of the planet's food products

into a huge vat and then jumping in and spinning around wildly. Another creature took out a long bugle in the middle of what appeared to be a friendly conversation and played it rudely in his partner's face. Meg wondered how these inhabitants could maintain such an orderly looking community with such odd standards of behavior.

Curious, she turned on her universal translator, introduced herself to a passerby, and requested an interview. The inhabitant spoke quickly, almost frenetically; and the translation that appeared on the handheld machine read: "Think? I can't even scrambled my brains are so talk." Was something wrong with the translator? A quick diagnostic check revealed that everything was in perfect working order. Meg approached another inhabitant with the same confusing results.

Perhaps a visit to the planet's archives would crack through the shell of apparent mystery. When Meg started reading the inhabitants' history, she discovered that they call themselves the Nezods, and that they develop in reverse. Born physically mature, they revert to egg form during their twilight years. As eggs, they exist forever, living on as keepers of all the knowledge and wisdom necessary for the continued advancement of the society. But the distribution of knowledge, as reflected in the arrangement of the eggs among the nine plots she'd seen upon landing, has to be balanced, just like everything else in the Nezod society. If this balance is disturbed, the Nezods are sent into the state of confusion that Meg was obviously witnessing.

Legends told of monstrous winged creatures who periodically invaded the community and disrupted the arrangement of the eggs, in an attempt to

render the Nezods helpless. Meg read that if balance is not restored by midnight on the day of the disturbance, the Nezods will be destroyed forever. In horror, she looked at her watch. It was nearly midnight! She quickly searched the archives for a diagram of the proper arrangement of the eggs. All she could find was a badly damaged map revealing how many eggs belonged in just one of the plots. Upon returning to the nine plots, she noted that those eggs were still undisturbed. But there was no way of knowing how many of the others had been tampered with. Frantic, Meg began to rearrange the eggs from plot to plot, hoping to find the proper balance that would restore the society to harmony.

HOW TO PLAY

Type each line of the program into your computer exactly as shown, carefully making the appropriate modifications (if needed). (See "Tips to the Typist," page 50, for help in typing programs.) Then SAVE it to disk or cassette.

When you RUN the program, you'll see the nine plots, each containing a number representing how many eggs are in that plot. You can move the cursor, which represents which plot you're standing in, from plot to plot by using your computer's cursor keys. (Notes to Apple and Atari owners: Since not all Apples have up- and down-arrow keys, use the I, J, K, and L keys to move the cursor up, left, down, and right, respectively. And on the Atari, don't hold down the CONTROL key when using the cursor keys to play.)

To move eggs from one plot to another, move the cursor to the first plot and press RETURN or ENTER. You'll see the question, PICK UP HOW MANY EGGS? Enter how many eggs you want to pick up from that plot (from one to all) and

press RETURN or ENTER again.

You're now carrying those eggs. (You'll notice that they disappear from the plot you're standing in.) Next, walk to the second plot (by moving the cursor) and press RETURN or ENTER again. This will cause you to "drop" the eggs you're carrying, adding them to the eggs already in the second plot, if any.

You may find that you can't pick up eggs from, or add any to, one of the plots. If that happens, it means you've discovered the one plot that already has the correct number of eggs.

Watch the clock on your screen closely. If you move the eggs into their correct arrangement before midnight, the computer will congratulate you and move into a surprise second program. (When you've solved the puzzle, see the solution on page 53 for instructions on using the second program.)

If you fail, the society will be destroyed on screen at midnight before your very eyes. You'll have to RUN the program again if you want to start over.

At any time, you can press the "Q" key to exit the program and the screen will clear. Type RUN and press RETURN or ENTER to play again.

PROGRAM NOTES

The way this program allows you to move the cursor about the grid and change the number under the cursor is very similar to the way a spreadsheet program works.

The lines of the program that handle the cursor movement begin in the low 500s. Keep in mind that H

and V are the horizontal and vertical positions of the cursor in the grid, each ranging from 1 to 3. For example, (1, 1) represents the upper left-hand corner plot.

If a cursor key is pressed, the program first reprints the value in the current plot—that is, square (H, V)—without the cursor. (The cursor is represented by a different color, an inverse bar, a pair of >pointers<, or an underline depending on the computer.)

Then the program adds 1 to (or subtracts 1 from) the value of V if a down (or up) arrow is pressed. Similarly, it adds 1 to, or subtracts 1 from, the value of H if a right or left arrow is pressed.

Finally, there is a "wrap-around" feature. If, for example, H=3 (meaning your cursor is in the bottom row) and you press the down-arrow key, 1 is added to H to get 4. But 4 is too big, so H is reset to 1. The result on the screen is that the cursor "wraps around" to the top row again.

The same programming principles also could be used to move an object around the screen, depending on the position of a joystick.

Note: For this program, the "cursor" keys are I, J, K, and L for Apple computers. If you have an Apple IIe or IIc, which have all four arrow keys, all you have to do is make a change in line 40 to make the program work with the true cursor keys instead of with I, J, K, and L. And owners of other computer brands may find it easier to make the program work with other keys of their choice instead of the cursor keys. Try it!

Apple/Scrambled Eggs

```
20 DIM HP(4),VP(4),M(3,3),SUM(8)
30 DL = 800:MAX = 7:MD = 10:SD = 50
40 UP = 73:DWN = 75:LF = 74:RT = 76
50 PICK = 0:SF = 1:MIN = 45:SEC = 0:CM = (MD*3-8)/2
60 $$ = CHR$(32):QS = $$:FOR X = 1 TO MD*3
```



```

70 QS = QS+SS:NEXT X:BS = LEFT$(QS,MAX+2)
80 FOR X = 0 TO 4:VP(X) = X*4+1:NEXT X
90 FOR X = 1 TO 4:HP(X) = (X-1)*MD+3:NEXT X
110 REM GOTO 340
120 FOR X = 1 TO 3:FOR Y = 1 TO 3:READ M(X,Y):NEXT Y,X
130 HOME:GOSUB 1020
140 VTAB 3:FOR X = 1 TO 3:INVERSE:PRINT QS
150 FOR Y = 1 TO 3:INVERSE:PRINT SS;:FOR Z = 1 TO 3
160 NORMAL:PRINT BS;:INVERSE:PRINT SS;:NEXT Z
170 PRINT:NEXT Y,X:INVERSE:PRINT QS:NORMAL
180 FOR V = 1 TO 3:FOR H = 1 TO 3:GOSUB 2010:NEXT H,V
190 H = 2:V = 2:GOSUB 2000
200 K = PEEK(-16384)-128
210 IF K > 0 THEN POKE -16368,0:GOTO 240
220 IF SF = 2 THEN 200
230 GOSUB 1000:ON MIN = 60 GOTO 600:GOTO 200
240 IF K = 81 OR K = 113 THEN HOME:END
250 ON K <> 13 GOTO 520:IF SF = 2 THEN 420
260 IF H = 1 AND V = 1 THEN 200
270 IF PICK = 0 THEN 360
280 PICK = 0:M(V,H) = M(V,H)+EGG:GOSUB 2000
290 C = 0:GOSUB 3000:FOR X = 1 TO 8
300 C = C+(SUM(X) = 12):NEXT X:IF C < 8 THEN 590
310 VTAB 18:HTAB 1:PRINT "CORRECT ARRANGEMENT!"
320 FLASH:PRINT "YOU SAVED THE NEZODS.":NORMAL
330 FOR D = 1 TO DL+2:NEXT D
340 SF = 2:FOR X = 1 TO 3:FOR Y = 1 TO 3
350 M(X,Y) = 0:NEXT Y:NEXT X:HOME:GOTO 140
360 VTAB 20:HTAB 1:INPUT "PICK UP HOW MANY EGGS? ";VS
370 VTAB 20:HTAB 1:PRINT QS;QS
380 EGG = VAL(VS):IF EGG < 1 THEN 410
390 IF EGG > M(V,H) THEN EGG = M(V,H)
400 PICK = 1:M(V,H) = M(V,H)-EGG:GOSUB 2000
410 SEC = SEC+4:GOSUB 1010:GOTO 200
420 VTAB 20:HTAB 1:INPUT "VALUE FOR THIS SQUARE: ";VS
430 VTAB 20:HTAB 1:PRINT QS;QS:IF VS = "" THEN 200
440 T = VAL(VS):IF T < 0 OR LEN(VS) > MAX THEN 200
450 M(V,H) = INT(T):GOSUB 2000:GOSUB 3000
460 FOR X = 1 TO 3:VTAB VP(4):HTAB HP(X)-1:PRINT BS
470 VTAB VP(4):HTAB HP(X)+(MAX-LEN(STR$(SUM(X))))/2
480 PRINT SUM(X):NEXT X
490 FOR X = 4 TO 8:VTAB VP(X-4):HTAB HP(4)-1:PRINT BS
500 VTAB VP(X-4):HTAB HP(4):PRINT SUM(X):NEXT X
510 GOTO 200
520 IF K <> UP AND K <> DWN AND K <> LF AND K <> RT TH
EN 200
530 GOSUB 4000:IF (K = LF) OR (K = RT) THEN 560
540 V = V+(K = DWN)-(K = UP)
550 V = V+((V < 1)-(V > 3))*3:GOSUB 2000:GOTO 580
560 H = H+(K = RT)-(K = LF)
570 H = H+((H < 1)-(H > 3))*3:GOSUB 2000
580 IF SF = 2 THEN 200
590 SEC = SEC+0.6:GOSUB 1010:IF MIN <> 60 THEN 200
600 FOR X = 1 TO 500:VTAB 3+RND(1)*13
610 HTAB 1+RND(1)*(MD+3+1):PRINT SS:NEXT X
620 FOR D = 1 TO DL:NEXT D:HOME:END
1000 FOR D = 1 TO SD:NEXT D:SEC = SEC+0.2
1010 IF SEC > 59.99 THEN SEC = SEC-60:MIN = MIN+1
1020 VTAB 1:HTAB CM:SEC$ = STR$(INT(SEC))
1030 IF SEC < 10 THEN SEC$ = "0"+SEC$
1040 IF MIN < 60 THEN 1070
1050 FLASH:PRINT SS;"MIDNIGHT!";SS:NORMAL
1060 GOSUB 2010:FOR D = 1 TO DL:NEXT D:RETURN
1070 PRINT "11: ";MIN;" ";SEC$;" PM":RETURN
2000 INVERSE
2010 TS = STR$(M(V,H)):B = HP(H)+(MAX-LEN(TS))/2
2020 GOSUB 4000:NORMAL:RETURN
3000 SUM(4) = 0:SUM(8) = 0
3010 FOR Y = 1 TO 3:SUM(Y) = M(1,Y)+M(2,Y)+M(3,Y)
3020 SUM(Y+4) = M(Y,1)+M(Y,2)+M(Y,3)
3030 SUM(8) = SUM(8)+M(Y,Y):SUM(4) = SUM(4)+M(4-Y,Y)
3040 NEXT Y:RETURN
4000 VTAB VP(V):HTAB HP(H)-1:PRINT BS;
4010 VTAB VP(V):HTAB B:PRINT TS;:RETURN
6000 DATA 7,1,2,3,7,5,6,2,3

```

Atari/Scrambled Eggs

```

10 DIM HP(4),VP(4),M(3,3),SUM(8)
20 DIM AS(31),CLS(1),QS(31),RS(1)
30 DIM SS(1),SEC$(2),TS(10),VS(9),Z$(7)
40 POKE 752,1:POKE 82,0:SETCOLOR 2,9,4
50 PICK=0:SF=1:MIN=45:SEC=0:CLS=CHR$(125)
60 SS=CHR$(32):QS=SS:QS(31)=SS:QS(2)=QS
70 RS=CHR$(160):AS=RS:AS(31)=AS:AS(2)=AS
80 FOR X=0 TO 4:VP(X)=X*4+1:NEXT X
90 FOR X=1 TO 4:HP(X)=(X-1)*10+2:NEXT X
100 REM GOTO 330
110 FOR X=1 TO 3:FOR Y=1 TO 3:READ T
120 M(X,Y)=T:NEXT Y:NEXT X
130 PRINT CLS;:GOSUB 1020
140 POSITION 0,3:FOR X=1 TO 3:PRINT AS
150 FOR Y=1 TO 3:PRINT RS;:FOR Z=1 TO 3
160 PRINT QS(1,9);:PRINT RS;:NEXT Z:PRINT
170 NEXT Y:NEXT X:PRINT AS
180 FOR V=1 TO 3:FOR H=1 TO 3:GOSUB 2000:NEXT H:NEXT V
190 H=2:V=2:GOSUB 3000
200 K=PEEK(764):POKE 764,255:IF K<>255 THEN 230
210 IF SF=2 THEN FOR D=1 TO 10:NEXT D:GOTO 200
220 GOSUB 1000:ON MIN=60 GOTO 580:GOTO 200
230 IF K=47 THEN POKE 752,0:POKE 82,2:PRINT CLS;:END
240 ON K<>12 GOTO 480:IF SF=2 THEN 390
250 IF H=1 AND V=1 THEN 200
260 IF PICK=0 THEN 350
270 PICK=0:M(V,H)=M(V,H)+EGG:GOSUB 3000
280 C=0:GOSUB 4000:FOR X=1 TO 8
290 C=C+(SUM(X)=12):NEXT X:IF C<8 THEN 570
300 POSITION 0,18:PRINT "CORRECT ARRANGEMENT!"
310 PRINT "YOU SAVED THE NEZODS."
320 FOR D=1 TO 800:NEXT D
330 SF=2:FOR X=1 TO 3:FOR Y=1 TO 3
340 M(X,Y)=0:NEXT Y:NEXT X:PRINT CLS:GOTO 140
350 GOSUB 5000:IF F OR T<1 THEN 380
360 EGG=T:IF EGG>M(V,H) THEN EGG=M(V,H)
370 PICK=1:M(V,H)=M(V,H)-EGG:GOSUB 3000
380 SEC=SEC+4:GOSUB 1010:GOTO 200
390 GOSUB 5000:IF F THEN 200
400 IF T<0 OR LEN(VS)>6 THEN 200
410 M(V,H)=INT(T):GOSUB 3000:GOSUB 4000
420 FOR X=1 TO 3:POSITION HP(X)-1,VP(4):PRINT QS(1,8);
430 Z$=STR$(SUM(X))
440 POSITION HP(X)+(7-LEN(Z$))/2,VP(4):PRINT Z$:NEXT X
450 FOR X=4 TO 8:POSITION HP(4)-1,VP(X-4):PRINT QS(1,8
);
460 POSITION HP(4),VP(X-4):PRINT SUM(X):NEXT X
470 GOTO 200
480 IF K<>6 AND K<>7 AND K<>14 AND K<>15 THEN 200
490 GOSUB 2000:IF SF=2 THEN 510
500 SEC=SEC+0.6:GOSUB 1010:IF HR=12 THEN 580
510 IF (K=6) OR (K=7) THEN 540
520 V=V-(K=14)+(K=15)
530 V=V+((V<1)-(V>3))*3:GOSUB 3000:GOTO 560
540 H=H-(K=6)+(K=7)
550 H=H+((H<1)-(H>3))*3:GOSUB 3000
560 IF SF=2 THEN 200
570 SEC=SEC+0.6:GOSUB 1010:IF MIN<>60 THEN 200
580 GOSUB 2000:FOR X=1 TO 500
590 POSITION RND(1)*30,3+RND(1)*12:PRINT SS:NEXT X
600 FOR D=1 TO 400:NEXT D:PRINT CLS;
610 POKE 752,0:POKE 82,2:END
1000 FOR D=1 TO 23:NEXT D:SEC=SEC+0.2
1010 IF SEC>59.99 THEN SEC=SEC-60:MIN=MIN+1
1020 POSITION 10,0:SEC$=STR$(INT(SEC))
1030 IF SEC<10 THEN SEC$(2)=SEC$:SEC$(1,1)="0"
1040 IF MIN<60 THEN 1070
1050 PRINT SS;"MIDNIGHT!";SS
1060 GOSUB 2000:FOR D=1 TO DL:NEXT D:RETURN
1070 PRINT "11: ";MIN;" ";SEC$;" PM":RETURN
2000 TS=STR$(M(V,H)):B=HP(H)+(7-LEN(TS))/2
2010 GOSUB 6000:RETURN
3000 TS=STR$(M(V,H)):B=HP(H)+(7-LEN(TS))/2
3010 FOR I=1 TO LEN(TS):TS(I,I)=CHR$(ASC(TS(I,I))+128)

```



```

3020 NEXT I:GOSUB 6000:RETURN
4000 SUM(4)=0:SUM(8)=0
4010 FOR Y=1 TO 3:SUM(Y)=M(1,Y)+M(2,Y)+M(3,Y)
4020 SUM(Y+4)=M(Y,1)+M(Y,2)+M(Y,3)
4030 SUM(8)=SUM(8)+M(Y,Y):SUM(4)=SUM(4)+M(4-Y,Y)
4040 NEXT Y:RETURN
5000 TRAP 5000:POSITION 0,20:IF SF=1 THEN 5020
5010 PRINT "VALUE FOR THIS SQUARE":GOTO 5030
5020 PRINT "PICK UP HOW MANY EGGS";
5030 F=1:POKE 752,0:INPUT VS:POKE 752,1
5040 POSITION 0,20:PRINT QS;QS:IF VS="" THEN 5060
5050 T=VAL(VS):F=0
5060 TRAP 4000:RETURN
6000 POSITION HP(H),VP(V):PRINT QS(1,7)
6010 POSITION B,VP(V):PRINT TS:RETURN
7000 DATA 7,1,2,3,7,5,6,2,3

```

Commodore 64 w/color TV or monitor /Scrambled Eggs

```

10 POKE 53281,12:POKE 53280,12
20 DIM HP(4),VP(4),M(3,3),SUM(8)
30 BM=20:DL=800:MAX=7:MD=10:SD=42
40 BL$=CHR$(144):YW$=CHR$(158):WHS=CHR$(5)
50 SS=CHR$(32):CL$=CHR$(147):RNS=CHR$(18)
70 PICK=0:SF=1:CM=(MD*3-10)/2:QS=SS
80 FOR X=1 TO MD*3:QS=QS+SS:NEXT X:BS=LEFT$(QS,MAX+2)
90 FOR X=0 TO 4:VP(X)=X*4:NEXT X
100 FOR X=1 TO 4:HP(X)=(X-1)*MD+2:NEXT X
110 REM GOTO 350
120 FOR X=1 TO 3:FOR Y=1 TO 3:READ M(X,Y):NEXT Y,X
130 PRINT WHS;CL$
140 TS=RNS+BL$+SS:POKE 214,2:PRINT
150 FOR X=1 TO 3:PRINT RNS;BL$:QS
160 FOR Y=1 TO 3:PRINT TS;:FOR Z=1 TO 3
170 PRINT SPC(MAX+2);TS;:NEXT Z
180 PRINT:NEXT Y,X:PRINT RNS;BL$:QS;WHS
190 FOR V=1 TO 3:FOR H=1 TO 3:GOSUB 2010:NEXT H,V
200 IF SF=1 THEN TIMES="114500":GOSUB 1000
210 H=2:V=2:GOSUB 2000
220 GET K$:IF K$<>" THEN K=ASC(K$):GOTO 250
230 IF SF=2 THEN 220
240 GOSUB 1000:ON -(HRS="12") GOTO 620:GOTO 220
250 IF K=81 OR K=209 THEN PRINT CL$:END
260 ON -(K<>13) GOTO 540:VS="":IF SF=2 THEN 430
270 IF H=1 AND V=1 THEN 220
280 IF PICK=0 THEN 370
290 PICK=0:M(V,H)=M(V,H)+EGG:GOSUB 2000
300 C=0:GOSUB 3000:FOR X=1 TO 8
310 C=C-(SUM(X)=12):NEXT X:IF C<8 THEN 610
320 POKE 214,BM-2:PRINT:PRINT "CORRECT ARRANGEMENT!"
330 PRINT BL$;"YOU SAVED THE NEZODS.";WHS
340 FOR D=1 TO DL*2:NEXT D
350 SF=2:FOR X=1 TO 3:FOR Y=1 TO 3
360 M(X,Y)=0:NEXT Y,X:PRINT CL$:GOTO 140
370 POKE 214,BM:PRINT:INPUT "PICK UP HOW MANY EGGS";VS
380 POKE 214,BM:PRINT:PRINT QS;QS
390 EGG=VAL(VS):IF EGG<1 THEN 420
400 IF EGG>M(V,H) THEN EGG=M(V,H)
410 PICK=1:M(V,H)=M(V,H)-EGG:GOSUB 2000
420 GOSUB 1000:GOTO 220
430 POKE 214,BM:PRINT:INPUT "VALUE FOR THIS SQUARE";VS
440 POKE 214,BM:PRINT:PRINT QS;QS:IF VS="" THEN 220
450 T=VAL(VS):IF T<0 OR LEN(VS)>MAX THEN 220
460 M(V,H)=INT(T):GOSUB 2000:GOSUB 3000
470 FOR X=1 TO 3:POKE 214,VP(4):PRINT
480 PRINT SPC(HP(X)-1);BS
490 Z$=MID$(STR$(SUM(X)),2):POKE 214,VP(4):PRINT
500 PRINT SPC(HP(X)+(MAX-LEN(Z$))/2);Z$:NEXT X
510 FOR X=4 TO 8:POKE 214,VP(X-4):PRINT
520 PRINT SPC(HP(4)-1);BS:POKE 214,VP(X-4):PRINT
530 PRINT SPC(HP(4)-1);SUM(X):NEXT X:GOTO 220
540 IF K<>17 AND K<>29 AND K<>145 AND K<>157 THEN 220
550 GOSUB 4000:IF (K=29) OR (K=157) THEN 580
560 V=V-(K=17)+(K=145)
570 V=V-((V<1)-(V>3))*3:GOSUB 2000:GOTO 600

```

```

580 H=H-(K=29)+(K=157)
590 H=H-((H<1)-(H>3))*3:GOSUB 2000
600 IF SF=2 THEN 220
610 GOSUB 1000:IF HRS<>"12" THEN 220
620 FOR X=1 TO 500:POKE 214,2+RND(1)*(BM-2):PRINT
630 PRINT SPC(1+RND(1)*(MD*3+1));SS:NEXT X
640 FOR D=1 TO DL:NEXT D:PRINT CL$;:END
1000 POKE 214,0:PRINT:PRINT SPC(CM);
1010 HRS=LEFT$(TIMES,2):IF HRS<>"12" THEN 1040
1020 PRINT YW$;SS;"MIDNIGHT!";SS;WHS
1030 GOSUB 2010:FOR D=1 TO DL:NEXT D:RETURN
1040 PRINT "11:";MID$(TIMES,3,2);":":
1050 PRINT RIGHT$(TIMES,2);" PM":RETURN
2000 PRINT YW$;
2010 TS=MID$(STR$(M(V,H)),2):B=HP(H)+(MAX-LEN(TS))/2
2020 GOSUB 4000:PRINT WHS;:RETURN
3000 SUM(4)=0:SUM(8)=0
3010 FOR Y=1 TO 3:SUM(Y)=M(1,Y)+M(2,Y)+M(3,Y)
3020 SUM(Y+4)=M(Y,1)+M(Y,2)+M(Y,3)
3030 SUM(8)=SUM(8)+M(Y,Y):SUM(4)=SUM(4)+M(4-Y,Y)
3040 NEXT Y:RETURN
4000 POKE 214,VP(V):PRINT:PRINT SPC(HP(H)-1);BS
4010 POKE 214,VP(V):PRINT:PRINT SPC(B);TS:RETURN
5000 DATA 7,1,2,3,7,5,6,2,3

```

IBM PC/Scrambled Eggs

```

10 DEF SEG=0:KEY OFF:DIM HP(4),VP(4),M(3,3),SUM(8)
20 DL=800:LM=21:SD=69:SW=80
30 SS=CHR$(32):WIDTH SW:LOCATE ,0
40 PICK=0:SF=1:MIN=45:SEC=0:CM=LM+10
50 QS=STRING$(31,32):YS=CHR$(219)
60 BS=STRING$(9,32):XS=STRING$(31,219)
70 FOR X=0 TO 4:VP(X)=X*4+1:NEXT X
80 FOR X=1 TO 4:HP(X)=(X-1)*10+2+LM:NEXT X
90 REM GOTO 320
100 FOR X=1 TO 3:FOR Y=1 TO 3:READ M(X,Y):NEXT Y,X
110 COLOR 2,0:CLS:GOSUB 1020
120 LOCATE 3,1:FOR X=1 TO 3:PRINT TAB(LM);X$
130 FOR Y=1 TO 3:PRINT TAB(LM);Y$;
140 FOR Z=1 TO 3:PRINT BS;Y$;:NEXT Z
150 PRINT:NEXT Y,X:PRINT TAB(LM);X$
160 FOR V=1 TO 3:FOR H=1 TO 3:GOSUB 2010:NEXT H,V
170 H=2:V=2:GOSUB 2000
180 K$=INKEY$:POKE 1050,PEEK(1052)
190 ON LEN(K$)+1 GOTO 200,220,500
200 IF SF=2 THEN FOR D=1 TO 5:NEXT D:GOTO 180
210 GOSUB 1000:IF MIN=60 THEN 590 ELSE 180
220 K=ASC(K$):IF K=81 OR K=113 THEN CLS:END
230 IF K<>13 THEN 180 ELSE IF SF=2 THEN 400
240 IF H=1 AND V=1 THEN 180
250 IF PICK=0 THEN 340
260 PICK=0:M(V,H)=M(V,H)+EGG:GOSUB 2000
270 C=0:GOSUB 3000:FOR X=1 TO 8
280 C=C-(SUM(X)=12):NEXT X:IF C<8 THEN 580
290 LOCATE 18,1+LM:PRINT "CORRECT ARRANGEMENT!"
300 COLOR 9:PRINT SPC(LM);"YOU SAVED THE NEZODS."
310 COLOR 2:FOR D=1 TO DL*2:NEXT D
320 SF=2:FOR X=1 TO 3:FOR Y=1 TO 3
330 M(X,Y)=0:NEXT Y:NEXT X:CLS:GOTO 120
340 LOCATE 20,1:INPUT "PICK UP HOW MANY EGGS";VS
350 LOCATE 20,1:PRINT QS;QS
360 EGG=VAL(VS):IF EGG<1 THEN 390
370 IF EGG>M(V,H) THEN EGG=M(V,H)
380 PICK=1:M(V,H)=M(V,H)-EGG:GOSUB 2000
390 SEC=SEC+4:GOSUB 1010:GOTO 180
400 LOCATE 20,1:INPUT "VALUE FOR THIS SQUARE";VS
410 LOCATE 20,1:PRINT QS;QS:IF VS="" THEN 180
420 T=VAL(VS):IF T<0 OR LEN(VS)>6 THEN 180
430 M(V,H)=INT(T):GOSUB 2000:GOSUB 3000
440 FOR X=1 TO 3:LOCATE VP(4),HP(X)-1:PRINT BS
450 Z$=MID$(STR$(SUM(X)),2)
460 LOCATE VP(4),HP(X)+(7-LEN(Z$))/2:PRINT Z$:NEXT X
470 FOR X=4 TO 8:LOCATE VP(X-4),HP(4)-1:PRINT BS
480 LOCATE VP(X-4),HP(4)-1:PRINT SUM(X):NEXT X
490 GOTO 180

```



```

500 K=ASC(RIGHT$(K$,1))
510 IF K<>72 AND K<>75 AND K<>77 AND K<>80 THEN 180
520 GOSUB 4000:IF (K=75) OR (K=77) THEN 550
530 V=V-(K=80)+(K=72)
540 V=V-((V<1)-(V>3))*3:GOSUB 2000:GOTO 570
550 H=H-(K=77)+(K=75)
560 H=H-((H<1)-(H>3))*3:GOSUB 2000
570 IF SF=2 THEN 180
580 SEC=SEC+.6:GOSUB 1010:IF MIN<>60 THEN 180
590 FOR X=1 TO 500
600 LOCATE 3+RND*12,RND*31+LM:PRINT S$:NEXT X
610 FOR D=1 TO DL:NEXT D:CLS:END
1000 FOR D=1 TO SD:NEXT D:SEC=SEC+.2
1010 IF SEC>59.99 THEN SEC=SEC-60:MIN=MIN+.1
1020 LOCATE 1,CM:SEC$=MID$(STR$(INT(SEC)),2)
1030 IF SEC<10 THEN SEC$="0"+SEC$
1040 MIN$=MID$(STR$(MIN),2):IF MIN<60 THEN 1070
1050 COLOR 9:PRINT S$;"MIDNIGHT!";S$:COLOR 2
1060 GOSUB 2010:FOR D=1 TO DL:NEXT D:RETURN
1070 PRINT "11:";MIN$;":":SEC$;" PM":RETURN
2000 COLOR 9
2010 TS=MID$(STR$(M(V,H)),2):B=HP(H)+(7-LEN(TS))/2
2020 GOSUB 4000:COLOR 2:RETURN
3000 SUM(4)=0:SUM(8)=0
3010 FOR Y=1 TO 3:SUM(Y)=M(1,Y)+M(2,Y)+M(3,Y)
3020 SUM(Y+4)=M(Y,1)+M(Y,2)+M(Y,3)
3030 SUM(8)=SUM(8)+M(Y,Y):SUM(4)=SUM(4)+M(4-Y,Y)
3040 NEXT Y:RETURN
4000 LOCATE VP(V),HP(H)-1:PRINT B$
4010 LOCATE VP(V),B:PRINT TS:RETURN
5000 DATA 7,1,2,3,7,5,6,2,3

```

TRS-80 Color Computer/Scrambled Eggs

```

10 CLEAR 500:DIM HP(4),VP(4),M(3,3),SUM(8)
20 DL=700:MAX=4:MD=7:SD=23:UP=94:WL=32:LM=1:F=0
30 BM=352:S$=CHR$(32):W$=CHR$(175):H$=W$
40 PICK=0:SF=1:MIN=45:SEC=0:CM=(MD*3-10)/2+LM
50 R$=W$:FOR X=1 TO MD*3:Q$=Q$+S$:R$=R$+W$:NEXT X
60 B$=LEFT$(Q$,MAX+2):C$=LEFT$(R$,MAX+2)
70 X$=H$:Y$=H$
80 FOR X=1 TO 3:X$=X$+C$+H$:Y$=Y$+B$+H$:NEXT X
90 FOR X=0 TO 4:VP(X)=(X+2)*WL:NEXT X
100 FOR X=1 TO 4:HP(X)=(X-1)*MD+LM+2:NEXT X
110 REM GOTO 320
120 FOR X=1 TO 3:FOR Y=1 TO 3:READ M(X,Y):NEXT Y,X
130 CLS:GOSUB 1020
140 PRINT@2*WL,"";
150 FOR Z=1 TO 3:PRINT TAB(LM);X$
160 PRINT TAB(LM);Y$:NEXT Z:PRINT TAB(LM);R$
170 FOR V=1 TO 3:FOR H=1 TO 3:GOSUB 2000:NEXT H,V
180 H=2:V=2:GOSUB 3000
190 K$=INKEY$:IF K$<>" " THEN K=ASC(K$):GOTO 220
200 IF SF=2 THEN 190
210 GOSUB 1000:ON -(MIN=60) GOTO 580:GOTO 190
220 IF K=81 OR K=113 THEN CLS:END
230 ON -(K<>13) GOTO 500:V$="":IF SF=2 THEN 400
240 IF H=1 AND V=1 THEN 190
250 IF PICK=0 THEN 340
260 PICK=0:M(V,H)=M(V,H)+EGG:GOSUB 3000
270 C=0:GOSUB 4000:FOR X=1 TO 8
280 C=C-(SUM(X)=12):NEXT X:IF C<8 THEN 570
290 PRINT@BM+LM,"CORRECT ARRANGEMENT!"
300 PRINT TAB(LM);"YOU SAVED THE NEZODS."
310 FOR D=1 TO DL*2:NEXT D
320 SF=2:FOR X=1 TO 3:FOR Y=1 TO 3
330 M(X,Y)=0:NEXT Y,X:CLS:GOTO 140
340 PRINT@BM,"PICK UP HOW MANY EGGS";:INPUT V$
350 PRINT@BM,Q$;Q$
360 EGG=VAL(V$):IF EGG<1 THEN 390
370 IF EGG>M(V,H) THEN EGG=M(V,H)
380 PICK=1:M(V,H)=M(V,H)-EGG:GOSUB 3000
390 SEC=SEC+.4:GOSUB 1010:GOTO 190
400 PRINT@BM,"VALUE FOR THIS SQUARE";:INPUT V$
410 PRINT@BM,Q$;Q$:IF V$="" THEN 190
420 T=VAL(V$):IF T<0 OR LEN(V$)>MAX-F THEN 190
430 M(V,H)=INT(T):GOSUB 3000:GOSUB 4000

```

```

440 FOR X=1 TO 3:PRINT@VP(4)+HP(X)-1,B$;
450 Z$=MID$(STR$(SUM(X)),2)
460 PRINT@VP(4)+HP(X)+(MAX-LEN(Z$))/2,Z$;:NEXT X
470 FOR X=4 TO 8:PRINT@VP(X-4)+HP(4)-1,B$;
480 PRINT@VP(X-4)+HP(4)-1,SUM(X);:NEXT X
490 GOTO 190
500 IF K<>8 AND K<>9 AND K<>10 AND K<>UP THEN 190
510 GOSUB 2000:IF (K=8) OR (K=9) THEN 540
520 V=V-(K=10)+(K=UP)
530 V=V-((V<1)-(V>3))*3:GOSUB 3000:GOTO 560
540 H=H-(K=9)+(K=8)
550 H=H-((H<1)-(H>3))*3:GOSUB 3000
560 IF SF=2 THEN 190
570 SEC=SEC+.6:GOSUB 1010:IF MIN<>60 THEN 190
580 FOR X=1 TO 500:PRINT@RND(BM-WL)+WL,S$;
590 NEXT X:FOR D=1 TO DL:NEXT D:CLS:END
1000 FOR D=1 TO SD:NEXT D:SEC=SEC+.2
1010 IF SEC>59.99 THEN SEC=SEC-60:MIN=MIN+.1
1020 SEC$=MID$(STR$(INT(SEC)),2)
1030 IF SEC<10 THEN SEC$="0"+SEC$
1040 MIN$=MID$(STR$(MIN),2):IF MIN<60 THEN 1070
1050 PRINT@CM,S$;"MIDNIGHT!";S$
1060 GOSUB 2000:FOR D=1 TO DL:NEXT D:RETURN
1070 PRINT@CM,"11:";MIN$;":":SEC$;" PM":RETURN
2000 TS=MID$(STR$(M(V,H)),2):B=HP(H)+(MAX-LEN(TS))/2
2010 GOSUB 5000:RETURN
3000 TS=MID$(STR$(M(V,H)),2):B=HP(H)+(MAX-LEN(TS))/2-1
3010 TS=">"+TS+"<":GOSUB 5000:RETURN
4000 SUM(4)=0:SUM(8)=0
4010 FOR Y=1 TO 3:SUM(Y)=M(1,Y)+M(2,Y)+M(3,Y)
4020 SUM(Y+4)=M(Y,1)+M(Y,2)+M(Y,3)
4030 SUM(8)=SUM(8)+M(Y,Y):SUM(4)=SUM(4)+M(4-Y,Y)
4040 NEXT Y:RETURN
5000 PRINT@VP(V)+HP(H)-1,B$;
5010 PRINT@VP(V)+B,TS;:RETURN
6000 DATA 7,1,2,3,7,5,6,2,3

```

MODIFICATIONS FOR OTHER COMPUTERS

ADAM/Scrambled Eggs

Use the Apple version, with the following alterations. Add lines 10, 100, and 5000:

```

10 LOMEM: 29000
100 FOR i = 28000 TO 28005:READ a:POKE i,a:NEXT i
5000 DATA 62,0,50,117,253,201
Also, change lines 30, 40, 200-230, and 1000 to read as follows:
30 dl = 1000: max = 4: md = 7: sd = 135
40 up = 160: dwn = 162: lf = 163: rt = 161
200 CALL 28000:FOR d = 1 TO sd:NEXT d:IF sf = 2 THEN 220
210 GOSUB 1000:IF min = 60 THEN 600
220 VTAB 20:HTAB 1:k = PEEK(64885)
230 ON k > 0 GOTO 240:GOTO 200
1000 sec = sec+.2

```

Commodore 64 w/B&W TV or monochrome monitor/Scrambled Eggs

Use the version labeled "Commodore 64 w/color TV or monitor," except change line 40 to read as follows:

```
40 BLS=CHR$(144):YWS=BLS:WHS=CHR$(5)
```

IBM PCjr/Scrambled Eggs

Use the IBM PC version, except change line 20 to read as follows:

```
20 DL=900:LM=1:SD=49:SW=40
```

TRS-80 Model III/Scrambled Eggs

Use the TRS-80 Color Computer version, except change lines 20 and 30 to read as follows:

```
20 DL=300:MAX=9:MD=12:SD=8:UP=91:WL=64:LM=9:F=4
30 BM=704:S$=CHR$(32):W$=CHR$(143):H$=CHR$(191)
```


VIC-20/Scrambled Eggs

Use the version labeled "Commodore 64 w/color TV or monitor," with the following alterations. Add line 60:

```
60 AS=SS:FOR X=1 TO 20:AS=AS+SS:NEXT X
```

Change lines 10, 30, 370, 380, 430, and 440 to read as follows:

```
10 POKE 36879,25
```

```
30 BM=18:DL=900:MAX=2:MD=5:SD=44
```

```
370 POKE 214,18:PRINT:PRINT "PICK UP HOW MANY EGGS":IN  
PUT VS
```

```
380 POKE 214,18:PRINT:PRINT AS:PRINT AS
```

```
430 POKE 214,18:PRINT:PRINT "VALUE FOR THIS SQUARE":IN  
PUT VS
```

```
440 POKE 214,18:PRINT:PRINT AS:PRINT AS:IF VS="" THEN  
220
```

Finally, if you are using a color television or monitor, change line 40 to read as follows:

```
40 BL$=CHR$(144):YWS=CHR$(28):WHS=CHR$(31)
```

If you are using a black-and-white television or monochrome monitor, change line 40 to read as follows:

```
40 BL$=CHR$(144):YWS=BL$:WHS=CHR$(31)
```

PROGRAMMING P.S.

Corrections to previous months' programs

Apple/Banner (April 1985, page 63)

To run *Banner* under ProDOS, change lines 500 and 690 to read as follows:

```
500 PRINT CHR$(4);"PR# 1"
```

```
690 PRINT CHR$(4);"PR# 0"
```

TI-99/4A/Perpetual Calendar (January 1985, page 74)

The first minus sign in line 190 should have been a plus sign:

```
190 LD(2)=28+SGN(((Y=INT(Y/4)*4)*(Y<>INT(Y/100)*100))+  
(Y=2000))
```

TRS-80 Color Computer/Disk Label Maker (June 1984, page 78), **Brain Terrain** (August 1984, page 86), **The Black Mask** (October 1984, page 80), **By Invitation Only** (December 1984, page 116), **Perpetual Calendar** (January 1985, page 75), **Banner** (April 1985, page 67)

All these programs require Extended Color BASIC. In the future, when a CoCo program requires Extended Color BASIC, we'll tell you so clearly. We apologize for any inconvenience this omission may have caused.

But if you have standard Color BASIC, all is not lost! These six programs all contain a STRINGS function, which, while it's missing in Color BASIC, can be simulated.

STRINGS, often used in the form

```
AS=STRINGS(number, code)
```

is a function that creates a string containing *number* characters, each of which has ASCII code *code*. For example, STRINGS(50,32) creates a string of 50 spaces (the ASCII code for space is 32; see your manual). Another way to create strings of this kind is with a statement such as

```
FOR X=1 TO number:AS=AS+CHR$(code):NEXT X
```

For example, to create a string of 50 spaces we could write

```
FOR X=1 TO 50:AS=AS+CHR$(32):NEXT X
```

CoCo owners who don't have Extended Color BASIC may wish to use this approach to modify the six programs listed above to run on their computers.

TRS-80 Color Computer/Banner (April 1985, page 67)

You can print longer messages if you add line 5:

```
5 CLEAR 1000
```

Also see the note above.

TRS-80 Model III/Banner (April 1985, page 67)

On a Model III (and a Model 4 running Model III BASIC), you can print longer messages if you add line 5:

```
5 CLEAR 1000
```

VIC-20 w/8K or 16K RAM Cartridge/Optical Illusion (April 1985, page 59)

In Line 30, SH=17 should have read SH=16:

```
30 SH=16:SW=22:TRU=-1:ES=" <RETURN> ":CLS=CHR$(147)
```

Corrections to programs from "Helpful Hints"

ADAM & Apple/Print Out Your Disk Directory

(April 1985, page 50)

This program was incorrect as published. The following program will work correctly:

```
10 DS = CHR$(4)
```

```
20 PRINT DS;"PR# 1"
```

```
30 PRINT DS;"CATALOG"
```

```
40 PRINT DS;"PR# 0"
```

This program will print out the directory of the "current" disk or (ADAM) digital data pack. To print the directory of the disk or pack in another drive, add the designation of that drive after CATALOG in line 30. For example, to print the directory of the data pack in the second ADAM data drive, or the disk in the second Apple disk drive, you'd change line 30 to

```
30 PRINT DS;"CATALOG,D2"
```

The first ADAM disk drive is referred to as D5.

Also, if your Apple printer card is in a slot other than slot 1, change the 1 in line 20 to the number of that slot.

IBM PCs/Print out Your Disk Directory (April 1985, page 50)

If you've specially configured your system, you may have to use the name of the device on which you want the directory printed. Thus, the command you use might be DIR>LPT1, DIR>LPT2, DIR>LPT3, DIR>AUX, DIR>COM1, or DIR>COM2.

TRS-80 Model III/Print Out Your Disk Directory

(April 1985, page 50)

To print the directory of the disk in the first or second drive, the command is DIR:0 (PRT) or DIR:1 (PRT), respectively.

TRS-80 Models III & 4/Rule Your Stationery (April 1985, page 50)

The program works fine under TRSDOS Version 6 BASIC. But on a Model III (and a Model 4 running Model III BASIC), you need to add a line to the program:

```
5 CLEAR 1000
```


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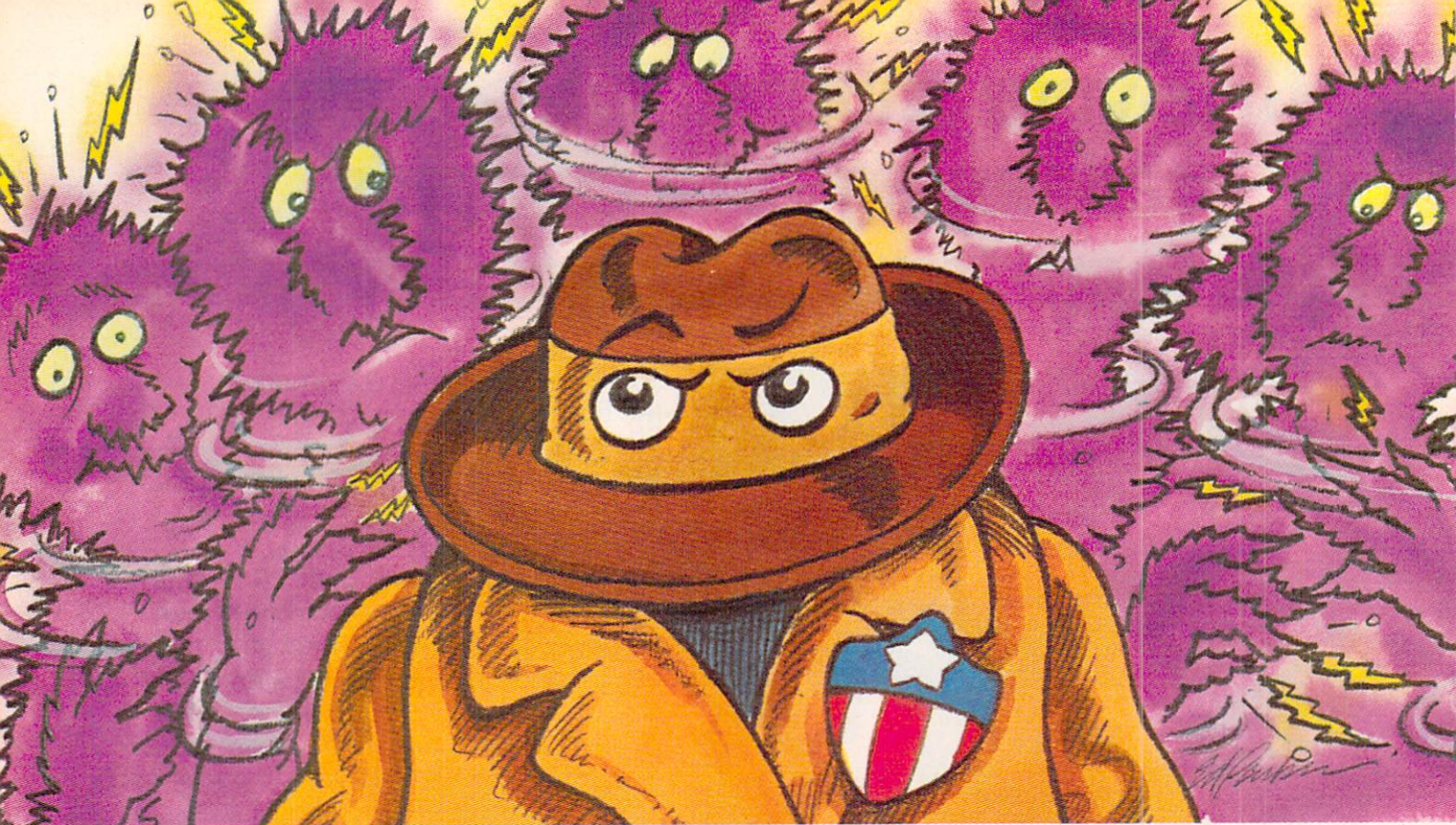
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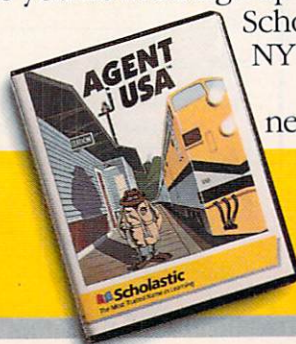
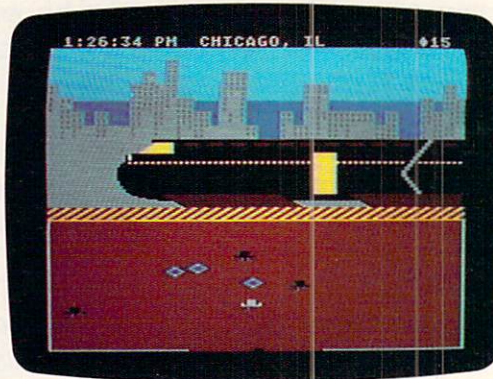
The FuzzBomb is turning millions of men, women and children into mindless fuzzbodies. And Agent U.S.A. can't stop the devious plague spreader without your help.

But don't accept the assignment unless you're really prepared to stretch your mind. Because sharp eyes and quick reflexes aren't enough to stop the fuzz plague. You'll have to outthink and outplan the FuzzBomb as you pursue him around the country in super-fast rocket trains. And you'll have to remember state capitals, learn the time zones and figure out the quickest routes across the nation. If you don't, the fuzzbodies will turn you into one of them.

Become one of the few super-agents to defeat the FuzzBomb and you may win a trip to intelligence headquarters in Washington, D.C. What's more, even if you never catch the evil one, tell us what you like about the game and you can become an instant winner of an Agent U.S.A. knapsack (see package for contest details).

Agent U.S.A. needs you now. So sign up where you usually buy your software. Or write to Scholastic Inc., Dept. EW, 730 Broadway, New York, NY 10003.

Do it before the fuzz plague comes to your neighborhood!



Scholastic
The Most Trusted Name in Learning

Available for Apple, Atari, Commodore and IBM.

Next 8 Pages!!

LOGON, page 66
DR. KURSOR'S KLINIC, page 67
GAME STRATEGY, page 68
MICROTONES, page 70
COMPUCOPIA, page 72
CONTEST, page 72

Next Month!
Exclusive Interview
With Lord British!!

Edited by Anne Krueger

K-POWER[®]

FOR THE COMPUTER GENERATION

Make your computer work for you this summer! Try K-POWER's five ways to make some extra dough with your computing and programming skills. Maybe these examples will give you inspiration!

1 Sell your hint know-how. Ed Savin, 18, is an experienced gamer. He cut his computing teeth in 1975 by solving Scott Adams' *Adventure*. Now Ed has created a small empire by publishing adventure game hint books from his home in Easton, Connecticut. He calls the company Witt's End. "I saw there was a real need for game hints. Whenever I went to users' groups, people would ask me what to do next in an adventure game," Ed says.

Ed sells hint books (covering a wide selection of Infocom and Sierra adventure games, among others) to more than 300 retail stores, and has sold more than 4,000 copies!

You can share your gaming hints with K-POWER readers. We pay \$10 for hints (we haven't heard of) that we publish in our Strategy section. Send hints to: HINT HOTLINE, c/o K-POWER, 730 Broadway, New York, NY 10003.

2 Computerize your favorite sport.

Perry Pierce, 18, was the official scorekeeper for the Little League in Darien, Connecticut. He used to keep track of every run, hit, and error, plus compile player and team statistics for 10 teams, 130 players, and 16 games per team—all with a handheld calculator! It wasn't long before Perry, and friend Robert Locke, 19, decided it would be a lot smarter to write a statistics program. It took them two months to write the statistics-keeping program

5 Ways to Make \$\$ With Your Computer



Matthew Krevat juggles word processing and dating.

they called *BASES* on the school's Digital PDP 1134 computer. Coaches from all over the league raved about the program so Perry and Robert are now in the process of marketing it.

3 Be a computer tutor. Peter Green, 17, had a brainstorm one day when his pockets were particularly empty: What about becoming a tutor and selling computer know-how? "So a friend and I went down to a local elementary school and passed out flyers. We got so many replies we had to turn some away!" Peter of Cuper-

tino, California, remembers.

That was three years ago. Today, Peter is still giving computer lessons. And he doesn't search for pupils—they search for him! "It might start off slow," says Peter, "but by word of mouth your name will get around."

This past summer, Peter gave lessons to 10 students every Tuesday and Thursday in his Apple-equipped computer room. He charged \$6 an hour for a private lesson and \$4.50 for a semiprivate lesson (two people).

4 Sell your designs. When Chris Magid, 15, couldn't afford a light pen for his Atari, he decided to build one. It took a lot of research, and long hours at the local Dallas, Texas, Radio Shack, to make a prototype. Then he borrowed some money from his dad to pay for the parts, manufactured a bunch, and sold them at his local Atari users group for about \$20 each. Even though the packaging was crude (he sold the pens in shoe boxes with a handlettered logo on them), he sold more than \$1,500 worth!

5 Sell your typing skills. "My teachers agree that a good-looking report will receive a better grade than a messy one," Matthew Krevat, 17, of Brooklyn, New York, says. So he types up reports on his TRS-80 CoCo with *TeleWriter 64*, a word-processor, for students who don't know how to type.

Matthew charges \$2 per page of writing that needs to be typed. "This has gained me money for a few dates so it may also work for your readers," he says. "I give girls discounts and ask them to make up the difference by dating me."

Computer-Savvy Meredith Becomes Radio Reviewer Celeb!

Computer know-how has made 10-year-old Meredith Jones Frummer a radio celebrity in New York City! Meredith, who'll be in sixth grade at Fieldston School in New York this fall, is a regular on WNYC-AM's "Small Things Considered" radio show. The radio program airs every Monday through Saturday, from 5 p.m. to 8 p.m. ET.

Meredith's job is to review software on a "Small Things Considered" segment called "Sam's Computer School," which airs every Tuesday from 5 p.m. to 6 p.m. Thomas Trocco hosts the show along with a talking Commodore 64 called "Sam." The computer was named after the SAM voice synthesizer, which enables it to "talk."

Meredith's four reviews per week are honest and unbiased. She gives a general overview of each program and then tells her audience what she really thinks of it. "I review all types of programs, but especially stuff for kids," says Meredith. She notes this is a change from usual software reviews done by adults who might not know exactly what a younger person is looking for in a program.

Not all of Meredith's reviews are positive. "If I don't think a program is that good, I'll say so," Meredith points out. She takes her reviewing responsibilities very seriously, and also has exposed a number of bugs in programs on the market.

Meredith certainly has the qualifications to be a software reviewer. She's been computing for four years—first on a VIC-20 and now on

Meredith Jones Frummer, 10.



PHOTOGRAPH BY THOMAS TROCCO

a Commodore 64. "I began playing games and word-processing my homework using *Paper Clip*. Then I got interested in programming," she explains. She's taken BASIC and Logo programming classes at an area college and has studied computer science at camp.

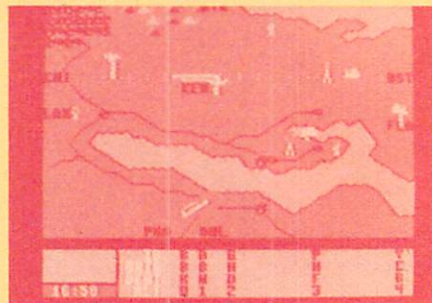
Besides working for WNYC, Meredith writes a software review column in the New York Commodore Users' Group (NYCUG) newsletter, and has had programs published in *Turtle News*, the Young People's Logo Association newsletter, and the *Midnight Software Gazette*. She's also had tips on programming shortcuts published in *RUN* magazine.

Meredith would like to destroy the myth that girls aren't as interested in computers and programming as boys are. Many girls do participate in the computer class at school, she says. "At Fieldston, my computer class is about 50-50 (girls and boys). A lot of my girlfriends have computers, and many of our callers on 'Small Things Considered' are girls, too."

There's a good possibility that the "Small Things Considered" radio show will go national on the American Public Network in September, so all of our readers can tune in. Tell 'em K-POWER sent you! —SUZETTE HARVEY

Software Scoop!

Love flight simulators? We've heard of a new one called **Kennedy Approach** from **MicroProse Software**. This \$34 simulation, available for C 64 computers, puts you in the air-traffic controller seat. Your job is to ensure the safety of hundreds of passengers! An added twist: You actually *hear* your instructions and responses from pilots as radio messages are exchanged between ground control and jets. . . . New from **Origin Systems, Inc.** is **Moebius I—The Orb of Celestial Harmony**. This fantasy role-playing game for Apple (planned for C 64 and IBM) computers takes you on a trip through the four elemental planes of earth, water, air, and fire in search of the mysterious Orb. It's \$59. . . . And attention **Lord British** fans!! Are you ready for **Ultima IV—Quest of the Avatar**? **Ultima IV**—coming out for Apple (including Macintosh), IBM, and C 64 computers—is 16 times larger than any previous **Ultima** version. It occupies both sides of two disks! To find out more about **Ultima IV**, check out K-POWER next month! Our July edition will feature an exclusive interview with **Ultima**'s fantastic creator: Lord British! Be there!



Kennedy Approach puts you in the air-traffic controller's seat!

LOGON

L E T T E R S

MICROTONES RAVE!

Your *Hacksville Hoedown* (April Microtones) is delightful! It's hard to believe such a short program could produce so complicated a song. Please get Barney and Jake together many more times. I'll be looking forward to future programs.

The rhythm, the effect of a banjo being strummed, and a nicely designed

screen all make up a program I'll run again and again. It must have taken a great deal of hard work to put it all together and you have my thanks and my compliments on a job well done.

Encore! Encore!

MARILYN HOWATH
Macedonia, Ohio

Dear Marilyn,

We're delighted you were pleased with Joey Latimer's musical creation. Look for more short music programs—including a computerized version of a song written by Steve Miller Band members Kenny Lee Lewis and Gary Mallaber—in future editions of K-POWER's Microtones.

THE EDITORS

DOCTOR KURSOR'S KLINIC

What is a RAM disk?

DR. KURSOR: A RAM disk is like a superfast disk drive—one that works anywhere from two to 100 times faster than the drive you have now. It's a drive that's completely silent, almost never needs repair or adjustment, and costs about as much as a normal drive.

What I'm talking about is a chunk of Random-Access Memory (RAM) working at the lightning speed of your computer's regular memory. Using a special "RAM-disk" program, you can *trick* your computer into thinking this piece of RAM is a disk drive.

If your computer already has memory to spare, all you need is this special program to create a RAM disk. Otherwise, you'll have to buy more memory, too.

Without a RAM disk, if you add more than 64K to Apples, Ataris, and other 8-bit computers, only software that's specially written to do complicated swapping of memory blocks will use the extra K. And even many programs for 16-bit computers, which can handle more than 64K at once, don't take advantage of humongous amounts of RAM. But *all* your programs (except for some copy-protected software) can benefit from a RAM disk.

A program to convert part of RAM into a RAM disk is often included free when you buy a memory expander for an 8-bit computer (and for the 128K PCjr as well).

So what's the hitch? Well, a RAM disk forgets everything when you turn the power off, just like regular RAM, unless you've chosen a memory expander with battery backup. So when you first power up, you have to move the programs or files you want to access quickly from a

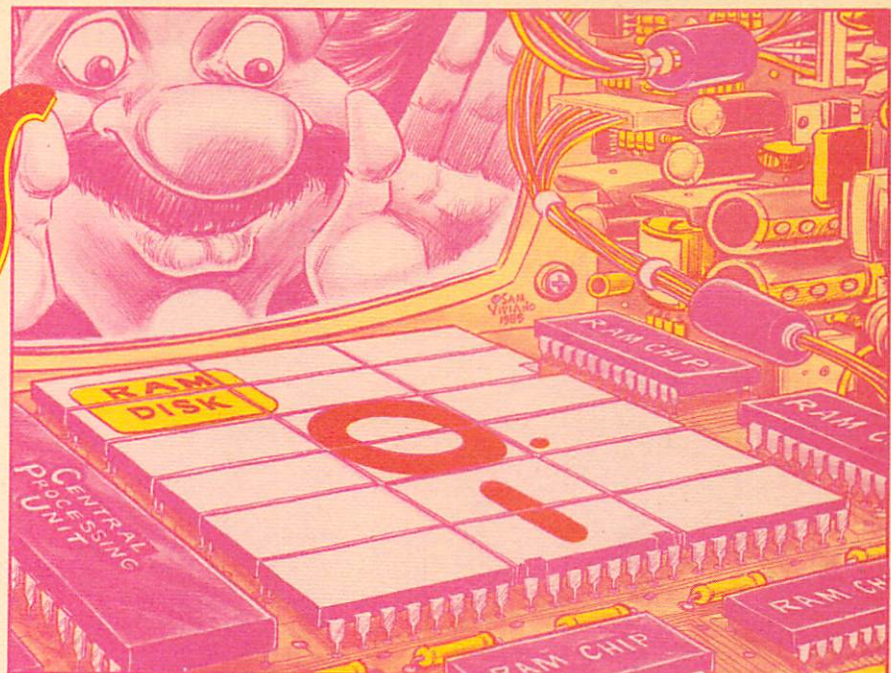


ILLUSTRATION BY SAM VITANO

regular disk to your RAM disk—and save them back to a floppy before you turn off the power. But in between, you've got the fastest drive on the block!

A RAM disk isn't for everybody. If the programs you're using access the disk drive only occasionally, you'll spend as much time loading them into the RAM disk as you'll save in drive access time.

But if you're running a program—maybe a data-base manager or a compiler, or a Macintosh one—that keeps going to your disk, you'll be amazed at how much quicker it'll run. And if you have only one disk drive, a RAM disk will cut back on boring disk swapping when you copy a disk.

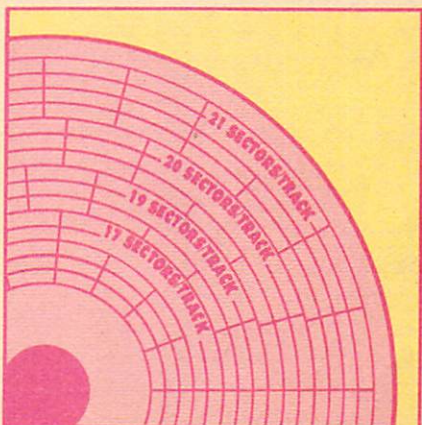
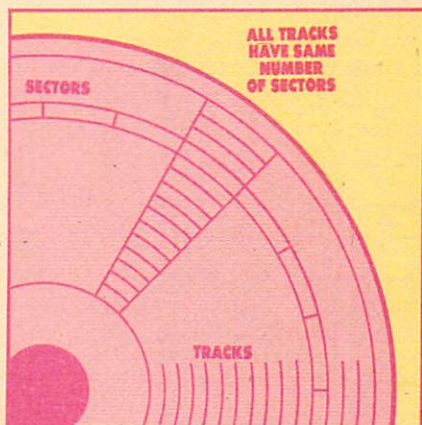
What are tracks and sectors on a disk?

DR. KURSOR: Though you can't see it, the surface of a formatted floppy disk is very organized. The data is divided into 35–80 rings, called "tracks," one inside another (see diagrams). The drive's read-write head moves in and out to reach each one.

Each track is divided into blocks called "sectors." DOS keeps track of where information is on a disk by remembering what sector it's in. A sector's the minimum amount that can be read or written at one time.

Usually, sectors get bigger the nearer you get to the outer edge of

the disk (see top diagram), even though they don't contain any more data. A few drives, like the Commodore and Macintosh, divide the bigger tracks into more sectors (see bottom diagram) and cram more info into the larger, outer tracks. This requires some fancy electronics, but gets more K onto a disk.



DIAGRAMS BY PAT LYNDS

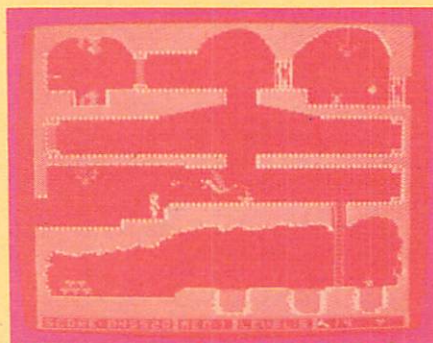
STRATEGY

TIPS, TRICKS, AND HINTS

CONAN

Datasoft. Arcade adventure. Your mission: To seek out and destroy the evil Volta, Conan's arch-enemy. (Hints and game for Apple.)

On level 3, wait on the ladder, just high up enough to avoid the ants, until the teleporter shows up.



Throw your sword from here to slay the dragon.

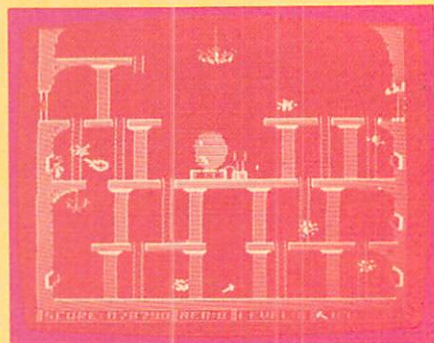
Be sure there are no ants anywhere on the screen, and run for the portal. Once on the top level, be sure to touch the bird.

On level 4, hide on the upper ladder, as close to the top as possible, until a gem or sword appears. This spot gives you easy access to all platforms.

Also on level 4, be sure to get an extra gem before you leave. It is very hard to get one on level 5.

On level 5, jump onto the first step and get as close to the wall as you can. This puts you below the dragons' fireballs but lets you kill an oncoming dragon if you throw your sword when the dragon is slightly past the lamp.

On level 6, go down the closest ladder and kill the eyes from behind the torch; the sparks can't get you there.



Stand here and you can hit the eye without being killed.

On level 7, stand on the catapult for a while. This will give you enough strength to turn a star back into a gem.

On any level, have patience. A good barbarian always thinks before he acts.—MITCHELL WELLS, 13, San Gabriel, California; MIKE FISHER, 16, St. Paul, Minnesota; SPECIAL Ks

PASTFINDER

Activision. Arcade/skill. Your mission: To collect artifacts on a radiation-filled planet and deliver them to your bases, which are scattered around the board. (Hints and game for Atari, Commodore.)

Hold down the fire button if continuous fire doesn't bother you.

Always use a scrambler and beam shield (if you have them) on squares with black boxes.

Heavy metal should always be in use.

Don't get overly distracted by shooting the objects in your way. They're just not worth risking death for.

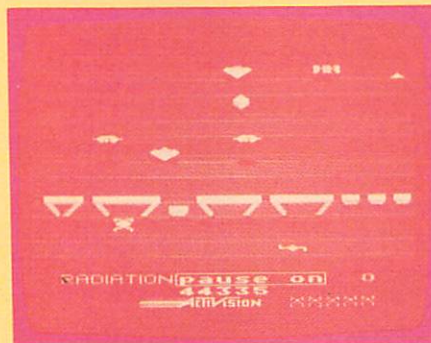
When your radiation level starts getting high, don't waste time collecting artifacts. Head for the nearest diamond as fast as you can.

If the free lives are out of your way, i.e. below you or through a zone of high radiation, you're better off forgetting them. You'd probably lose a lot more than you'd gain by pursuing them.

After getting to the top of a set of screens, take down any scrambler or beam shield you have. When you get back to the lower levels you won't encounter too many enemy ships.

When traveling without protection on "black box" screens, try to stay to one side of the screen. This will give you the most time to react against enemy ships.

The best way to avoid enemy ships and their shots is to jump over them.—SPECIAL Ks



Roam across an alien landscape in search of artifacts.

STARCROSS

Infocom. Text adventure. Your mission: To explore an ancient alien artifact you discover while traveling through space. (Hints and game for Apple, Atari, Commodore 64, IBM, TI-99/4A, TRS-80.)

Look into the barrel of the raygun. You'll find something useful.

Although the tape library may seem useless in the beginning, make sure you bring it with you.

Try hitting the rat/ant nest with something heavy.

Make sure you're using the visor fragment when you look into the projector.

Get the mouse to take all your items except one disk, then stand on your remaining one.

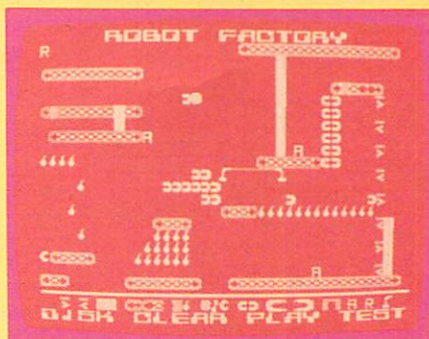
The raygun is not used for killing.

Place all your rods into the basket.—ADAM NORTHRUP, 14, Dansville, New York; BRIAN POFF, 17, Pittsburgh, Pennsylvania; JEFFREY PANKRATZ, 13, Holcomb, New York

MR. ROBOT AND HIS ROBOT FACTORY

Datamost. Arcade/construction set. Your mission: To trundle around a multileveled factory, consuming power pellets, and avoiding alien fire and other assorted obstacles. Game-maker option lets you build your own screens. (Screen created for the Apple.)

Got the Mr. Robot blues? That's when you've become a master at Datamost's *Mr. Robot and His Robot*.



Copy this level as shown for an exciting challenge!

bot Factory, have solved every level, but want more. Well, get out your SAVE disk and joystick, because we've got a level that will knock your socks off. Carefully copy the picture into your computer (we've put a grid over the picture to help you put the pieces in the right places), SAVE it, and play away. Be sure to copy the picture exactly as it appears here, or you may find it impossible to solve. You may find the keyboard controls (A, Z, left/right arrows) easier to use since they're more precise.—SPECIAL Ks

ENCOUNTER

Synapse. Strategy/arcade. Your mission: To destroy all enemies on each of eight levels through the use of strategy, concentration, skill, and your trusty blaster. (Hints and game for Atari, Commodore 64.)

When fighting saucers, remember to use barriers to deflect your opponents' shots. For example, when you're fighting a time-bomb saucer, and it explodes, the only

thing to do is hide behind the nearest barrier and wait for the shots to go by.

When fighting saucers, keep moving forward. This prevents them from sneaking up from behind. When fighting drones, keep moving backward to maximize your firing time.

If you want to go through the levels quicker, keep restarting the game until there are only 10 enemies in a sector.

The best way to shoot opponents you can't see is to align their radar signals with the top cross hair and blast away.

When traversing between levels, move only when an obstacle appears in your target sighting.

To avoid shots headed for you, back off—moving either left or right depending on where the shots are coming from.—SPECIAL Ks

H I N T H O T L I N E

WIZARDRY, Sir-tech (Apple, IBM). Fantasy/role-playing adventure. Your mission: To organize a hearty band of adventurers and set off to slay the evil arch-mage, Werdna.

Always take magic items from your fallen adventurers before taking them to the temple. This way, you won't lose them should the gang at the temple fail.

(Apple only) There are other beneficial things to "I"dentify besides item No. 9. "I"dentifying "S" will give the character below the bishop 100,000,000 experience points, and "J" will give the character below the bishop 100,000,000 gold pieces. However, don't try "M", "H", "+", ":", "!" as these cause adverse effects.—R.R. PROKOPF, 20, Dearborn, Michigan; SPECIAL Ks

MINER 2049er, Reston Software (C 64, VIC-20). Arcade/skill. Your mission: Claim all the mine sections while avoiding radioactive mutants.

On any board, hold down the joystick button for a few seconds, and you'll advance to the next board.

While you won't receive any points, you will be able to skip any level.—LOUIS MORRIS, Jackson, New Jersey

DUNGEONS OF DAGGORATH.

Tandy/Radio Shack (CoCo). Graphic adventure. Your mission: To penetrate the multiple levels of the dungeon and destroy the wizard who controls it.

Hold on to all useless items (e.g. dead torches, empty flasks) and stay in one cell of the dungeon with the items "D"ropped in front of you. You can rest here, and if a monster attacks, he'll have to collect all of the items before attacking. While he's doing this, you can attack him.—ARISTOTLE VINUYA, 13, Livonia, Michigan

ULTIMA III, Origin Systems (Apple, Atari, C 64, IBM). Fantasy/role-playing. Your mission: To gain power and experience in the hopes of destroying the evil Exodus.

After your characters are off, start killing monsters so that their

treasure chests form a wall around the castles and towns. This will give you some safe places to rest and recuperate; monsters can't cross treasure chests.—DAN PALERMO, 16, Ballwin, Missouri

DEATH IN THE CARIBBEAN, Micro Fun (Apple, C 64). Graphic adventure. Your mission: To get through the perils of a dangerous island and find the buried treasure.

Some of the puzzles are there to distract you from your goal.

Pay careful attention to the key of the music in the church.—BRYAN STEELE, 11, Mapleton, Illinois

We're looking for a few good hints! Help K-POWER readers be all that they can be by sending us hints for your favorite games. We have all the Zork and Pac-Man hints we can handle, but we'll be glad to publish and pay \$10 for hints we've not heard of. Send them to Hint Hotline, c/o K-POWER, 730 Broadway, New York, NY 10003. (Note: the computer systems listed in brackets indicate the computer versions the hints work for.)



MUSIC PROGRAMS BY JOEY LATIMER

Tuning a guitar can be a frustrating experience. Professional guitarists often have the luxury of using expensive tuning devices with meters that show whether each individual string should be tightened or loosened. Most guitarists, however, are forced to use inexpensive products, such as tuning forks and pitch pipes, to get their guitars on pitch.

Guitarists, don't fret. In *Microtones* this month, we've come to the rescue with an almost hands-free guitar tuning program for your computer. With this program, your computer will patiently play each note you select as long as you need to hear it, and will never run out of wind! All you have to do is press the space bar to select the string you want to tune, and press the "P" key to make the sound. Pressing the "P" key again will turn off the sound. Soon you'll be calling your computer the *Ultimate Pitch Pipe*.



APPLE/ULTIMATE PITCH PIPE

```
10 DIM L(6,7),B(6),ST(6,6),N(6)
20 FOR I = 0 TO 6:B(I) = 2^I:NEXT I
30 FOR I = 1 TO 6:FOR J = 1 TO 7
40 READ L(I,J):NEXT J:NEXT I
50 FOR I = 1 TO 6:FOR J = 1 TO 6
60 READ ST(I,J):NEXT J:NEXT I
70 FOR I = 1 TO 6:READ N(I):NEXT I
80 FOR I = 768 TO 785:READ A:POKE I,A:NEXT I
90 HGR:HOME
100 VTAB 21:HTAB 3:PRINT "***** THE ULTIMATE PITCH PIPE *****"
110 PRINT "PRESS <SPACE BAR> TO MOVE FROM NOTE TO"
120 PRINT "NOTE, <P> TO TURN SOUND ON AND OFF, OR"
130 PRINT "TAB(13);<Q> TO QUIT."
140 HCOLOR= 5:HPLLOT 201,35 TO 277,35 TO 277,83 TO 201,83 TO 201,35
150 HCOLOR= 6:FOR Q = 2 TO 6:GOSUB 320:NEXT Q
160 HCOLOR= 5:FOR I = 47 TO 197 STEP 30:HPLLOT I,38 TO I,80:NEXT I
170 HCOLOR= 3:FOR I = 1 TO 6
```

```
180 FOR J = 1 TO 7:V = L(I,J):FOR K = 6 TO 0 STEP -1
190 IF V >= B(K) THEN V = V-B(K):HPLLOT 8-K,27+I*8+J
200 NEXT K:NEXT J:NEXT I
210 Q = 1:F = 0
220 HCOLOR= 3:GOSUB 320
230 K = PEEK(-16384)-128:IF K < 0 THEN 230
240 KS = CHR$(K):POKE -16384,0
250 IF KS = "Q" OR KS = CHR$(113) THEN TEXT:HOME:END
260 IF KS = "P" OR KS = CHR$(112) THEN F = NOT F:IF F THEN POKE 6,N(Q):CALL 768:GOTO 230
270 IF KS <> " " THEN 230
280 HCOLOR= 6:GOSUB 320
290 Q = Q+1-6*(Q = 6):HCOLOR= 3:GOSUB 320
300 IF F THEN POKE 6,N(Q):CALL 768
310 GOTO 230
320 X = 10:Y = 31+Q*8:HPLLOT X,Y:FOR J = 1 TO 5 STEP 2
330 X = X+ST(Q,J):HPLLOT TO X,Y:Y = Y+ST(Q,J+1):HPLLOT TO X,Y:NEXT J
340 HPLLOT TO X-10,Y:RETURN
1000 DATA 63,32,32,60,32,32,63,12,18,33,33,63,33,33
1010 DATA 60,34,33,33,33,34,60,30,33,32,32,39,34,28
1020 DATA 62,33,33,62,33,33,62,63,32,32,60,32,32,63
1030 DATA 204,-10,-10,-10,20,10,230,-18,-10,-10,20,10
1040 DATA 256,-26,-10,-10,20,10,256,26,-10,10,20,-10
1050 DATA 230,18,-10,10,20,-10,204,10,-10,10,20,-10
1060 DATA 235,176,133,99,78,58,166,6,173,48,192,44,0
1070 DATA 192,48,7,234,202,208,247,76,0,3,96
```



COMMODORE 64/ULTIMATE PITCH PIPE

```
10 DIM H(6),L(6),SS(6),COS(6),PS(2)
20 S=54272:US=CHR$(145):DS=CHR$(17):LS=CHR$(157)
30 SMS=CHR$(182)+CHR$(181):BK$=CHR$(113)+CHR$(113)
40 FOR I=S TO S+24:POKE I,0:NEXT I
50 POKE S+5,96:POKE S+6,96:POKE S+24,15
60 FOR I=1 TO 6:READ H(I),L(I):NEXT I
70 FOR I=1 TO 6:READ CO:CO$=CHR$(CO):NEXT I
80 SP$=CHR$(160):FOR I=2 TO 12:SP$=SP$+CHR$(160):NEXT I
90 SS=CHR$(99):FOR I=2 TO 25:SS=SS+CHR$(99-24*(I/5=INT(I/5))):NEXT I
100 SS=SS+CHR$(123):FOR I=1 TO 14:SS=SS+CHR$(99):NEXT I
110 PS(1)=SMS+US+LS+LS+BK$:PS(2)=SMS+DS+LS+LS+BK$
120 FOR I=1 TO 3:PS(1)=CHR$(98)+US+LS+PS(1)
130 PS(2)=CHR$(98)+DS+LS+PS(2):NEXT I
140 FOR I=1 TO 6:READ TS,L,R
150 SS(I)=TS+LEFT$(SS,L)+CHR$(107+2*(I>3))
160 SS(I)=SS(I)+CHR$(145+128*(I>3))+LS
170 SS(I)=SS(I)+RIGHT$(PS(1-(I>3)),R):NEXT I
180 POKE 53280,0:POKE 53281,0
190 PRINT CHR$(147);TAB(3);CHR$(5);"***** THE ULTIMATE PITCH PIPE *****"
200 PRINT CHR$(28):POKE 214,5:PRINT:FOR I=1 TO 8
210 PRINT TAB(27);CHR$(28);CHR$(18);SP$:NEXT I
220 PRINT CHR$(5):FOR I=7 TO 11:POKE 214,I:PRINT
230 PRINT SS(I-5):NEXT I
240 POKE 214,18:PRINT
250 PRINT CHR$(5);TAB(4);"PRESS <SPACE BAR> TO MOVE FROM"
260 PRINT "STRING TO STRING, <P> TO TURN SOUND"
270 PRINT TAB(6);"ON AND OFF, OR <Q> TO QUIT."
280 P=6:F=0
290 POKE 214,P:PRINT:PRINT COS(1);SS(1)
300 GET KS:IF KS="" THEN 300
310 IF KS<>"Q" THEN 330
320 SYS 770:END
330 IF KS="P" THEN F=NOT F:GOSUB 1000:GOTO 300
340 IF KS<>" " THEN 300
350 POKE 214,P:PRINT
360 PRINT CHR$(5);SS(P-5):P=P+1+6*(P=11)
370 POKE 214,P:PRINT
380 PRINT COS(P-5);SS(P-5):IF F THEN GOSUB 1000
```



```

390 GOTO 300
1000 POKE S+4,-33*F:POKE S,-L(P-5)*F
1010 POKE S+1,-H(P-5)*F:RETURN
2000 DATA 5,71,7,12,9,104,12,143,15,210,21,31
3000 DATA 30,31,156,158,159,28
4000 DATA E,27,10,A,31,13,D,35,16
4010 DATA G,35,16,B,31,13,E,27,10

```



IBM PC W/COLOR GRAPHICS ADAPTER & IBM PCjr/ULTIMATE PITCH PIPE

```

10 KEY OFF:WIDTH 40:SCREEN 0,1
20 DIM ST$(6),PS(2),N(6)
30 US=CHR$(30):DS=CHR$(31):LS=CHR$(29)
40 SMS=CHR$(222)+CHR$(221):BKS=STRING$(2,219)
50 FOR I=1 TO 6:READ N(I):NEXT I
60 SS=CHR$(205):FOR I=2 TO 25
70 SS=SS+CHR$(205-(I/5=INT(I/5))*11):NEXT I
80 SS=SS+CHR$(216)+STRING$(14,205)
90 PS(1)=SMS+US+LS+LS+BKS:PS(2)=SMS+DS+LS+LS+BKS
100 FOR I=1 TO 3:PS(1)=CHR$(186)+US+LS+PS(1)
110 PS(2)=CHR$(186)+DS+LS+PS(2):NEXT I
120 FOR I=1 TO 6:READ TS,L,R
130 ST$(I)=TS+LEFT$(SS,L)+CHR$(188+(I>3))+CHR$(30-(I>3))
140 ST$(I)=ST$(I)+LS+RIGHT$(PS(1-(I>3)),R)
150 NEXT I
160 CLS:COLOR 13
170 PRINT TAB(3);"*--- THE ULTIMATE PITCH PIPE ---*"
180 COLOR 6:FOR I=5 TO 12
190 LOCATE I,27:PRINT STRING$(12,219):NEXT I
200 COLOR 15:FOR I=7 TO 11
210 LOCATE I,1:PRINT ST$(I-5):NEXT I
220 COLOR 14:LOCATE 18,4
230 PRINT "PRESS <SPACE BAR> TO MOVE FROM"
240 PRINT TAB(2);"STRING TO STRING, <P> TO TURN SOUND"
250 PRINT TAB(6);"ON AND OFF, OR <Q> TO QUIT."
260 P=6:F=0
270 COLOR P+3:LOCATE P,1,0:PRINT ST$(P-5)
280 KS=INKEY$:IF KS="" THEN 280
290 IF KS="Q" OR KS="q" THEN COLOR 7:CLS:SOUND 32767,0:END
300 IF KS="P" OR KS="p" THEN F=NOT F:SOUND N(P-5),-F*6
5535!:GOTO 280
310 IF KS"<" THEN 280
320 COLOR 15:LOCATE P,1:PRINT ST$(P-5):P=(P+1) MOD 6+6
330 COLOR P+3:LOCATE P,1:PRINT ST$(P-5)
340 IF F THEN SOUND 32767,0:SOUND N(P-5),65535!
350 GOTO 280
1000 DATA 164.81,220,293.66,392,493.88,659.26
2000 DATA E,27,10,A,31,13,D,35,16
2010 DATA G,35,16,B,31,13,E,27,10

```



TI-99/4A/ULTIMATE PITCH PIPE

```

10 DIM N(6)
20 CALL CHAR(152,"FFFFFFFFFFFFFFFF")
30 FOR I=0 TO 4
40 READ AS
50 FOR J=104 TO 144 STEP 8
60 IF (I<>2)+(J<128) THEN 80
70 AS="000000F8F8181818"
80 CALL CHAR(I+J,AS)
90 NEXT J
100 NEXT I
110 FOR I=1 TO 6
120 CALL COLOR(I+9,2,1)
130 READ N(I)

```

```

140 NEXT I
150 CALL COLOR(16,7,1)
160 CALL CLEAR
170 CALL SCREEN(16)
180 PRINT "*-THE ULTIMATE PITCH PIPE-*": : : : :
190 PRINT "E":"A":"D":"G":"B":"E": : : : :
200 PRINT " PRESS <SPACE BAR> TO MOVE"
210 PRINT " FROM STRING TO STRING,"
220 PRINT " <P> TO TURN SOUND ON AND"
230 PRINT TAB(5);"OFF, OR <Q> TO QUIT."
240 FOR I=4 TO 16 STEP 4
250 FOR K=104 TO 144 STEP 8
260 CALL HCHAR((K-104)/8+8,I,K,3)
270 CALL HCHAR((K-104)/8+8,I+3,K+1)
280 NEXT K
290 NEXT I
300 FOR I=7 TO 14
310 CALL HCHAR(I,20,152,8)
320 NEXT I
330 FOR I=0 TO 5
340 READ L,R
350 CALL HCHAR(I+8,20,105+I*8)
360 CALL HCHAR(I+8,21,104+I*8,L)
370 CALL HCHAR(I+8,21+L,106+I*8)
380 CALL VCHAR(I+8+(R-1)*(R>0)-(R<0),21+L,107+I*8,ABS(R)-1)
390 CALL HCHAR(I+8-R,21+L,108+I*8)
400 NEXT I
410 P=10
420 F=1
430 CALL COLOR(P,3,1)
440 CALL KEY(3,K,S)
450 IF S=-1 THEN 440
460 CALL SOUND(-4250,N(P-9),30*F)
470 IF (K<>113)*(K<>81) THEN 490
480 END
490 IF (K<>112)*(K<>80) THEN 520
500 F=-F-1
510 GOTO 440
520 IF K<>32 THEN 440
530 CALL COLOR(P,2,1)
540 P=P+1+6*(P=15)
550 CALL COLOR(P,(P-10)*2+4,1)
560 GOTO 440
1000 DATA 000000FFFF000000
1010 DATA 181818FFFF181818
1020 DATA 181818F8F8000000
1030 DATA 1818181818181818
1040 DATA FFFFFFFFFFFFFFFF
2000 DATA 165,220,294,392,494,659
3000 DATA 1,3,3,4,5,5,5,-5,3,-4,1,-3

```

M I C R O N O T E S

More music news. Another professional composer has come up with a way to use a C 64 in his work. **Ron Grant**, who works on soundtracks for CBS's **"Knots Landing,"** uses his C 64 much like a musical spreadsheet to create scores and figure out tempos for different parts of the show. Ron's brother **Richard** helped him out by developing **Auricle**—a program he describes as "the ear of the computer." **Auricle**, which understands English commands, includes all the mathematical variations of a "click-track book" (a listing of complicated figures for working on film soundtracks), reconciles "musical" time with "real" or "film" time, and manipulates tempos. Ron and Richard sold their first **Auricle** program to **Lance Rubin**, who used it to score a show of **"Dallas,"** saving himself a day of work in the process. **Auricle** is available for \$595.

—LINDA WILLIAMS

COMPUCOPIA

SHORT - SHORT PROGRAMS

APPLE/SHORT HELIX

```
10 DIM C(32,2),H(7,2)
20 P = 0:Q = 0:F = 0
30 FOR I = 0 TO 32:C(I,0) = SIN(I*.195)*20
40 C(I,1) = COS(I*.195)*20:NEXT I
50 H(0,0) = 140:H(0,1) = 90
60 CX = INT(RND(1)*7)+4:CY = INT(RND(1)*7)+4
70 HGR2
80 HCOLOR= 3
90 HPLLOT H(P,0)+C(Q,0),H(P,1)+C(Q,1) TO H(P,0)-C(Q,0),
H(P,1)-C(Q,1)
100 H(P,2) = Q:Q = Q+1:IF Q = 33 THEN Q = 0
110 Z = P:P = P+1:IF P = 8 THEN P = 0:F = 1
120 IF NOT F THEN 150
130 HCOLOR= 0
140 HPLLOT H(P,0)+C(H(P,2),0),H(P,1)+C(H(P,2),1) TO H(P,
0)-C(H(P,2),0),H(P,1)-C(H(P,2),1)
150 H(P,0) = H(Z,0)+CX:H(P,1) = H(Z,1)+CY
160 IF H(P,0) > 20 AND H(P,0) < 259 THEN 180
170 H(P,0) = H(Z,0)-CX:CY = -SGN(CX)*(INT(RND(1)*7)+4)
180 IF H(P,1) > 20 AND H(P,1) < 171 THEN 80
190 H(P,1) = H(Z,1)-CY:CY = -SGN(CY)*(INT(RND(1)*7)+4)
200 GOTO 80
```

ATARI 800 & 800XL/SHORT HELIX

```
10 DIM C(32,2),H(7,2)
20 P=0:Q=0:F=0
30 FOR I=0 TO 32:C(I,0)=SIN(I*.195)*20
40 C(I,1)=COS(I*.195)*20:NEXT I
50 H(0,0)=140:H(0,1)=90
60 CX=INT(RND(0)*7)+4:CY=INT(RND(0)*7)+4
70 GRAPHICS 8+16
80 COLOR 1:PLOT H(P,0)+C(Q,0),H(P,1)+C(Q,1)
90 DRAWTO H(P,0)-C(Q,0),H(P,1)-C(Q,1)
```

```
100 H(P,2)=Q:Q=Q+1:IF Q=33 THEN Q=0
110 Z=P:P=P+1:IF P=8 THEN P=0:F=1
120 IF NOT F THEN 150
130 COLOR 0:PLOT H(P,0)+C(H(P,2),0),H(P,1)+C(H(P,2),1)
140 DRAWTO H(P,0)-C(H(P,2),0),H(P,1)-C(H(P,2),1)
150 H(P,0)=H(Z,0)+CX:H(P,1)=H(Z,1)+CY
160 IF H(P,0)>20 AND H(P,0)<299 THEN 180
170 H(P,0)=H(Z,0)-CX:CY=-SGN(CX)*(INT(RND(0)*7)+4)
180 IF H(P,1)>20 AND H(P,1)<169 THEN 80
190 H(P,1)=H(Z,1)-CY:CY=-SGN(CY)*(INT(RND(0)*7)+4)
200 GOTO 80
```

IBM PC W/COLOR GRAPHICS ADAPTER & IBM PCjr/SHORT HELIX

```
10 SCREEN 1,0:CLS:KEY OFF
20 DIM C(32,2),H(7,2)
30 P=0:Q=0:F=0
40 FOR I=0 TO 32:C(I,0)=SIN(I*.195)*20
50 C(I,1)=COS(I*.195)*20:NEXT I
60 H(0,0)=140:H(0,1)=90
70 CX=INT(RND*7)+4:CY=INT(RND*7)+4
80 LINE (H(P,0)+C(Q,0),H(P,1)+C(Q,1))-(H(P,0)-C(Q,0),H
(P,1)-C(Q,1)),INT(RND*3)+1
90 H(P,2)=Q:Q=(Q+1) MOD 33
100 Z=P:P=(P+1) MOD 8:IF P=0 THEN F=-1
110 IF NOT F THEN 130
120 LINE (H(P,0)+C(H(P,2),0),H(P,1)+C(H(P,2),1))-(H(P,
0)-C(H(P,2),0),H(P,1)-C(H(P,2),1)),0
130 H(P,0)=H(Z,0)+CX:H(P,1)=H(Z,1)+CY
140 IF H(P,0)>20 AND H(P,0)<299 THEN 160
150 H(P,0)=H(Z,0)-CX:CY=-SGN(CX)*(INT(RND*7)+4)
160 IF H(P,1)>20 AND H(P,1)<179 THEN 80
170 H(P,1)=H(Z,1)-CY:CY=-SGN(CY)*(INT(RND*7)+4)
180 GOTO 80
```

'CAN HACKERS BE POETS?' CONTEST

Can hackers be poets?
Can hi-tech mix with art?
Please help us find out,
By doing your part.

For your poem to win would be
great,
Be it pure luck, great skill, or just
fate.
But you can't hope to win,
'Tlest your computer poetry's in,
Ere the contest's expiration date
(June 28).

If your poem's a winner,
Besides getting fame,
You'll receive some free software,
And accomplish our aim.

Can hackers be poets?
Can hi-tech mix with art?
To find out send your entry,
To K-POWER, not K Mart.

Send to: "Can Hackers Be Poets?"
Contest, c/o K-POWER, 730 Broadway,
New York, NY 10003.



My computer-theme poem:

My name _____ Age _____
Address _____
City _____ State _____ Zip _____
Telephone Number () _____ Male _____ Female _____
Computer(s) I use _____

WHAT'S IN STORE SOFTWARE GUIDE

QUICK TAKES ON SOFTWARE— NEW AND NOTEWORTHY

Welcome to FAMILY COMPUTING's Software Guide, the most comprehensive listing available of two dozen of the newest, most noteworthy, and/or best programs on the market. Our reviewers include families from all over the country who have judged the software according to the following criteria: long-term benefits and applications, adaptability, and advantages of using a computer for a given task. Programs have been evaluated and rated for their performance in each of the categories listed below. More detailed reviews follow the chart.

Here's a rundown of the rating categories and what they mean: **O** = Overall performance, given the limitations and capacities of the particular computer for which the software is intended. **D** = Documentation, or the instructions and literature that accompany a program. **EH** = Error-handling, the software's capacity to accommodate errors made by the user—an especially important consideration with software for younger users. **PS** = Play system, in the games reviews, the quality of the game design and the game's playability. **GQ** = Graphics quality, also evaluated in light of each particular brand's graphics capabilities. **EU** = Ease of use after the initial learning period, which varies from computer to computer. **V** = Value for money, or how the software measures up to its price.

HOME BUSINESS/HOME MANAGEMENT

Title Manufacturer Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings					
				O	D	EH	GQ	EU	V
KID PRO QUO Softsync, Inc. 162 Madison Ave. New York, NY 10016 (212) 685-2080 \$49 (IBM); \$29 (C 64) ©1984	Write stories and short papers, illustrate them and even add a simple soundtrack with this word processor for kids. Use inhibited by lack of on-screen helps, sketchy documentation, and some program errors. —BUMGARNER	Reviewed on IBM PC/PCjr, 128K (d.). Also for C 64 (d.). Planned for Apple II series.	90-day warranty (includes user-damaged); \$5 fee thereafter.	★ ★	★	★	★ ★ ★	D	★ ★
MASTERTYPE'S WRITING WIZARD The Scarborough System 55 S. Broadway Tarrytown, NY 10591 (914) 332-4545 \$79 (Apple, IBM); \$49 (C 64) ©1985	Write and edit term papers, letters, newsletters, and more with versatile word processor that includes special features, including an extra screen for notes and a built-in filing capability.† —BUMGARNER	Reviewed on Apple IIe/IIc, 128K (d.). Also for C 64 (d.); IBM PC/PCjr, 128K (d.).	30-day warranty (includes user-damaged); \$5 fee thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
THE MANAGER Commodore 1200 Wilson Drive West Chester, PA 19380 (215) 431-9100 \$49 ©1983	Powerful filing program with extensive mathematical capabilities suitable for complex home-filing tasks and small-business uses. Once learned, it's easy to use.† —AMATO	C 64 (d.).	90-day warranty.	★ ★ ★	★	★ ★ ★	N/A	E	★ ★ ★
THE WRITE FILE Tri Micro 14072 Stratton Way Santa Ana, CA 92705 (714) 832-6707 \$29 ©1984	Limited file system and word processor best suited for simple home tasks, such as form letters, short papers, mailing lists, club membership. —ZARDETTO AKER	C 64 (d.). Planned for Atari.	90-day warranty.	★ ★ ★	★ ★ ★	★ ★ ★	N/A	A	★ ★ ★

RATINGS KEY O Overall performance; D Documentation; EH Error-handling; GQ Graphics quality; EU Ease of use; V Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

EDUCATION/FUN LEARNING										
Title Manufacturer Price	Brief description	Hardware/ Equipment required	Backup provided	Ratings						
				O	D	EH	GQ	EU	V	
ACTORS AND ACTIONS Baudville 1001 Medical Park Drive SE Grand Rapids, MI 49506 (616) 957-3036 \$30 ©1984	Use and animate this library of characters in conjunction with TAKE 1. Cuts out some complicated steps and cuts down on time it normally takes for satisfying results. (See review of TAKE 1, below.) —FRANK	Apple II series, 64K (d.).	90-day warranty; \$5 fee for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★	
THE BODY TRANSPARENT DesignWare 185 Berry St. San Francisco, CA 94107 (800) 572-7767 \$44 ©1985	Identify bones and parts of the body, learn about functions of organs and diseases in straightforward anatomy program suggested for kids 9–16. —MORRIS	Reviewed on Apple II series, 48K. Planned for C 64 (d.), IBM PC/PCjr, 64K (d.).	90-day warranty; satisfaction guaranteed for first 30 days.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★	
EASY GRAPH Grolier Electronic Publishing Sherman Turnpike Danbury, CT 06816 (800) 858-8858 \$39 ©1984	Introduction to pictographs, bar graphs, and pie charts also serves as easy-to-use graphics utility for school papers and reports. For ages 8+. —MORRIS	Apple II series, 64K (d.). Planned for C 64; IBM PC/PCjr.	90-day warranty; \$10 fee for backup at time of purchase.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★	
LIBRARY ADVENTURE Learning Well 200 S. Service Road Roslyn Heights, NY 11577 (800) 645-6564 \$49 ©1984	Up to six players wander through a library, searching for rooms where they answer library-related questions (preprogrammed or ones you enter). Game keeps kids, ages 7–9, interested. —BUMGARNER	Apple II series, 48K (d.).	30-day warranty; \$20 fee thereafter for 1 year.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★	
MATH MAN Scholastic Software 730 Broadway New York, NY 10003 (212) 505-3567 \$39 ©1984	Scramble up and down ladders collecting correct integers to total special number in fun arcade game for ages 6–12. —MORRIS	Reviewed on Apple II series, 48K (d.). Planned for IBM PC/PCjr.	60-day warranty; \$5 thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★	
MONKEY ACADEMY Coleco Industries 999 Quaker Lane S. West Hartford, CT 06110 (203) 725-6660 \$15 ©1984	Math students 8 and up find missing numbers to complete addition, subtraction, multiplication, and division problems in lively arcade game. —DAVENPORT	Coleco ADAM (data cassette).	90-day warranty.	★ ★	★ ★	★ ★	★ ★	E	★ ★	
POETRY EXPRESS Learning Well 200 S. Service Road Roslyn Heights, NY 11577 (800) 645-6564 \$39 ©1984	Learn and write eight different styles of poetry, from limericks to haiku, in thorough tutorial/verse-processor for ages 7+. —MORRIS	Apple II series, 48K (d.). Planned for IBM PC/PCjr.	30-day warranty (includes user-damaged); \$10 fee thereafter or for backup.	★ ★ ★	★ ★ ★	★ ★ ★	N/A	A	★ ★ ★	
REMEMBER! DesignWare 185 Berry St. San Francisco, CA 94107 (800) 572-7767 \$79 ©1985	Electronic flashcard maker provides strategy for memorizing facts for school. Visual, verbal, or auditory hints can be included in powerful package for ages 12+. —MORRIS	Reviewed on Apple II series, 48K (d.). Also for C 64 (d.); IBM PC/PCjr (PC requires color card), 128K (d.).	90-day warranty; satisfaction guaranteed for first 30 days.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★	
SNOOPY'S READING MACHINE Random House Software 201 E. 50th St. New York, NY 10022 (800) 241-6042 \$29 ©1984	Accompanied by the "Peanuts" clan, beginning readers practice one-syllable words grouped in five different word families. Great graphics and fun music motivate ages 4–7. —BUMGARNER	Reviewed on Apple II series, 48K (d.). Also for C 64 (d.).	90-day warranty; \$5 fee thereafter for 9 months.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★	
TAKE 1 Baudville 1001 Medical Park Drive SE Grand Rapids, MI 49506 (616) 957-3036 \$59 ©1984	Create shapes and characters, or use images from graphics package and bring them to life in difficult but rewarding "cartoon-processor" package for ages 10+. Younger users will need help; all will need patience. —FRANK	Apple II series, 64K (d.).	90-day warranty; \$5 fee for backup or if user-damaged.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★	
RATINGS KEY O Overall performance; D Documentation; EH Error-handling; GQ Graphics quality; EU Ease of use; V Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; + Longer review follows chart										

GAMES REVIEWS BY JAMES DELSON

Title Manufacturer Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings					
				O	D	PS	GQ	EU	V
THE ANCIENT ART OF WAR Broderbund 17 Paul Drive San Rafael, CA 94903-2101 (415) 479-1170 \$44 ©1984	Challenging multilevel war game lets you use built-in scenarios and opponents (Napoleon, Genghis Khan, Caesar, and more), or create your own encounters. Best for beginners and pros taking a break; for ages 12+. †	IBM PC/PCjr, 128K (d.). Planned for Apple II series, Mac.	Unlimited warranty; \$5 fee if user-damaged.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
B.C. II: GROG'S REVENGE Sierra Inc. P.O. Box 485 Coarsegold, CA 93614 (209) 683-6858 \$34 ©1984	Steer Thor along mountain trails, through caverns, picking up clams, and avoiding Grog the dino and other perils. Wonderful graphics and easy play make this good for ages 8+.	Reviewed on C 64 (d.). Also for Coleco ADAM (data cassette) from Coleco. Joystick.	90-day warranty; \$5 fee thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★
GALACTIC ADVENTURES Strategic Simulations 883 Stierlin Rd., Bldg A-200 Mountain View, CA 94043 (415) 964-1353 \$59 ©1982-1984	Guide up to 10 different characters through a vast galaxy in exciting preprogrammed adventures or those you build yourself. Finest role-playing game ever. For ages 12+. †	Reviewed on Atari, 48K (d.). Also for Apple II series, 48K (d.).	30-day warranty; \$10 fee thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★ ★
HITCHHIKER'S GUIDE TO THE GALAXY Infocom 55 Wheeler St. Cambridge, MA 02138 (617) 492-1031 \$39 (Apple, IBM, TI); \$34 (Atari, C 64) ©1984	In this funny text adventure based on best-selling book, you are the lone surviving earthling, fated to wander the galaxy in a quest for truth and meaning. Good for sci-fi and text-adventure fans, ages 14+. It's tough, but "don't panic!" †	Reviewed on Apple II series, 48K (d.). Also for Atari, 32K (d.); C 64 (d.); IBM PC/PCjr, 64K (d.); Mac; TI-99/4A, 32K (d.).	90-day warranty; \$5 fee thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	N/A	D	★ ★ ★ ★
MASTER OF THE LAMPS Activision 2350 Bayshore Frontage Rd. Mountain View, CA 94043 (415) 960-0410 \$29 ©1985	Intriguing skill/arcade game puts you in the driver's seat on a flying carpet. After you've flown through a tunnel, you must match sounds and colors with a genie's offerings; for ages 8+.	C 64 (d.). Joystick.	1-year warranty.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
ON-COURT TENNIS Gamestar Inc. 1302 State St. Santa Barbara, CA 93101 (805) 963-3487 \$29 ©1984	Superb tennis simulation lets you choose player styles and court surfaces, then use joystick to control angle, speed, and direction of shots. Good for long-lasting play. For ages 10+. †	C 64 (d.). Joystick.	90-day warranty.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★ ★
PARIS IN DANGER Avalon Hill 4517 Harford Road Baltimore, MD 21214 (301) 254-5300 \$35 ©1983	Opposing armies face off in simulation of Napoleon's 1814 defense of France against Prussian/Austrian/Russian forces. Ages 12+ engage in both large-scale planning and close combat.	Atari, 48K (d.).	Unlimited warranty; \$10 fee if user-damaged, or for backup.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	D	★ ★ ★ ★
QUINK CBS Software 1 Fawcett Place Greenwich, CT 06836 (203) 622-2500 \$34 ©1985	Choose from a variety of subject areas, set a skill level, and prepare yourself for an exciting thinking/knowledge game. Trivia-like game makes terrific use of the computer. For ages 12+.	Reviewed on Apple II series, 48K (d.). Also for C 64 (d.); IBM PC/PCjr, 128K (d.).	90-day warranty; \$5 fee thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
SHORT CIRCUIT Micro Fun 2699 Skokie Valley Road Highland Park, IL 60035 (312) 433-7550 \$20 ©1985	Zip through a dazzling array of circuit boards as you try to head off the destruction of the world. Exciting game requires limited strategy, methodical movement, and a quick wrist. For age 8+.	Apple II series, 48K (d.).	30-day warranty; \$5 fee thereafter or if user-damaged.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★
WINGS OUT OF SHADOW Baen Enterprises 8 W. 36 St. New York, NY 10018 (212) 947-8244 \$34 ©1984	Command 10 ships in combat, defend flagship against boarding enemies. Several games in one simulate space adventure. Complex for beginners, but worth the effort. For ages 12+.	Apple II/II plus/IIe, 48K (d.).	30-day warranty; \$5 fee thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★
RATINGS KEY O Overall performance; D Documentation; PS Play system; GQ Graphics quality; EU Ease of use; V Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart									

WHAT'S IN STORE

SOFTWARE REVIEWS

On the following pages, you'll find in-depth reviews of some of the programs listed in the Software Guide. Refer back to the Guide on page 73 for information such as backup policies and addresses of software manufacturers.

HOME BUSINESS/HOME MANAGEMENT

MasterType's Writing Wizard

HARDWARE REQUIREMENTS: Reviewed on Apple IIe/IIc, 128K. Also for C 64, IBM PC/PCjr.

MANUFACTURER: The Scarborough System

PRICE: \$79 (Apple, IBM); \$49 (C 64)

While it is accessible to the novice, this word-processing package also offers powerful features for more sophisticated home uses.

As soon as you load the program, a blank screen appears, and you're ready to begin writing. Use the arrow keys to highlight the function you want to perform from among the extensive menu of options at screen-bottom.

If you want to save what you wrote, you'll need a data disk, but if you forgot to format one ahead of time, the program allows you to do it without losing your file.

This package has a number of impressive features: You can reorder paragraphs alphabetically and highlight text to be duplicated and re-sorted (for a bibliography) or rewritten (for a better essay or paper). Some of the most powerful tools are features that let writers highlight words, phrases, or blocks of text—then move, copy, and duplicate them onto another "window" screen. Keep notes, references, addresses, and more in this space. Store an outline in one window and text in another.

Writing Wizard is not bungle-proof, nor is it terribly simple to use, and the user manual is occasionally confusing. However, it contains more features than many family-oriented word processors. For instance, it lets you assign frequently used words or sentences to a single key-stroke and provides instructions for converting text files created with other word processors. If your writing needs extend beyond book reports and simple papers, it's worth considering.

—MARLENE ANNE BUMGARDNER

The Manager

HARDWARE REQUIREMENTS: C 64.
MANUFACTURER: Commodore Business Machines, Inc.

PRICE: \$49

I've been searching for software to help keep track of my extensive stamp collection since I bought my C 64. Most of the programs I examined were far too limited for my needs. The more capable ones were horribly expensive. *The Manager* is a powerful yet inexpensive package; I could use the money I saved to add more stamps to my collection.

The Manager is much more than a simple index-card filing program. With features allowing you to add and perform calculations on the data you enter, it rivals some data-base software costing considerably more. Using *The Manager*, I can track a stamp's original cost vs. its current value. I can log it into my system noting all vital facts including the year and country of issue, the purchase date, condition, cost, and the amount of profit I may or may not have made.

The package's few drawbacks include a report function that is extremely difficult to learn and use. Once mastered, however, this operation is very powerful. It allows you to gather, sort, and print the information in nearly any way you choose. The program's documentation doesn't help much. It often confuses rather than explains, sometimes showing illustrations or examples of on-screen prompts that don't match what actually appears on the screen.

The Manager has more capabilities than some families may need. It's a best bet, however, for households with complex filing requirements, tight software budgets, and patience.

—FRANCIS AMATO

EDUCATION/ FUN LEARNING

Poetry Express

HARDWARE REQUIREMENTS: Apple II series. Planned for IBM PC/PCjr.

MANUFACTURER: Learning Well

PRICE: \$39

MANUFACTURER'S SUGGESTED AGE: Grades 2–12

Tanka, cinquain, Sijo, diamante—if these sound like exotic cities you'd like to visit someday, spend some time with *Poetry Express* first!

They're actually styles of poetry, as are the more familiar haiku, limericks, and rhymes you'll learn about, write, and print with this package.

You're first presented with a menu of the eight styles of poetry. Choose a style to learn about, see examples of it, and then write your own poems. The on-disk explanations are clear and full of examples.

When you strike out on your own, *Poetry Express* is right there to help. The screen contains a summary of the key features of the poetry style you've selected, in case you've forgotten them. Word, phrase, and line prompts virtually guarantee that your poem will fit the style, in form at least. In fact, *Poetry Express* even provides a scratch sheet for you to scribble your ideas on. An editor allows for error correction or changes. Print out your masterpiece when you're finished, and/or save it as part of your portfolio. The package even includes an on-disk rhyming utility to use if you get stumped.

For the most part, *Poetry Express*' documentation is good, but it should have included more instructive information on the disk. Our kids found that they had to take notes on some of the key information. Also, although the package is marketed for children in grades 2–12 and over, young children will have trouble following directions and using the software effectively.

The visual display could have been more appealing, and a lot of time is spent loading programs from the disk. Also, error-correction is not especially easy. Nevertheless, this verse-processing package makes for a fine and thorough introduction to the world of poetry.

—TONY MORRIS

Easy Graph

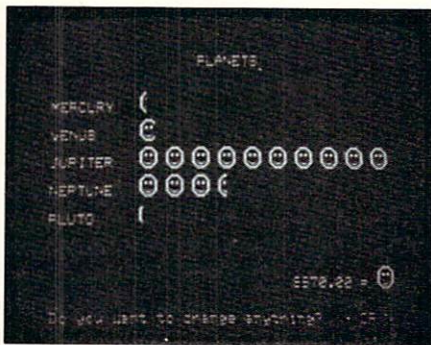
HARDWARE REQUIREMENTS: Apple II series. Planned for C 64, IBM PC/PCjr.

MANUFACTURER: Grolier Electronic Publishing

PRICE: \$39

MANUFACTURER'S SUGGESTED AGE: 8+

Easy Graph not only teaches you about different kinds of graphs, it's a utility program you can use to create and print simple ones. Even youngsters can learn to use *Easy Graph*—there's a complete, easy-to-follow tutorial on the disk that takes you through several kinds of graphs step by step. The documentation's question-and-answer format nicely



complements the on-disk tutorial. With practice material included in the package, you can try out various kinds of graphs.

Up to eight different items can be compared on pictographs, bar graphs, or pie charts (circle graphs). The graphs can be labeled if you wish. And the process of entering your data couldn't be easier—you just answer the questions that appear on the screen, and voilà: The computer does the rest! When you're done, you can print your graphs on a printer if you have an Epson, Apple dot-matrix, C. Itoh 8510A "Pro-Writer," or a printer with an Orange Micro GRAPPLER+ card. The resulting printout was stunning for our younger child and useful for our older children, who will be able to use *Easy Graph* when they prepare school papers and reports.

The software's only major flaw is that you can't save to disk any of the graphs you've created. If you don't print them, they are destroyed when you turn the computer off. Thus, if you want to display a series of graphs on the computer as visual aids for a verbal report, you must recreate each graph as you go along. If you create an interesting graph you would like to show somebody and you don't have a printer, you're out of luck—a drawback in an otherwise excellent package.

—TONY MORRIS

Remember!

HARDWARE REQUIREMENTS: Reviewed on Apple II series. Also for C 64, IBM PC/PCjr (PC requires color card).

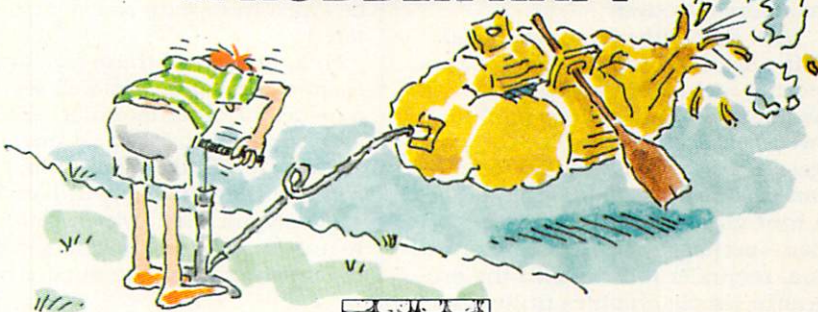
MANUFACTURER: DesignWare

PRICE: \$79

MANUFACTURER'S SUGGESTED AGE: 12 +

Remember! does for flashcards what word processing has done for typing! Use it to create electronic flashcards that can even include graphics and short songs. In the process, it teaches techniques for memorizing mate-

HOW TO BLOW UP A RUBBER RAFT



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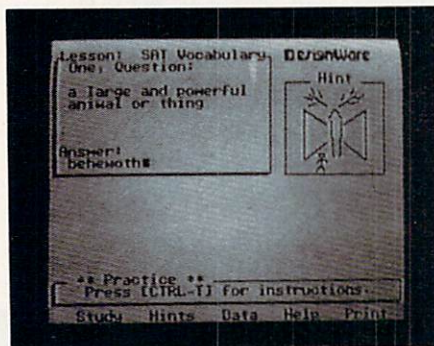
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WHAT'S IN STORE

SOFTWARE REVIEWS

rial more effectively.

With *Remember!* you write and edit a set of questions and answers, storing them as "lessons" on a disk. As many as 20 questions (and answers) can be included in a single lesson, and about 30 to 50 lessons can be stored on a single data disk. A hint may accompany each question—perhaps a written clue, or a visual reminder (drawn with the program's simple graphics utility), or even a brief suggestive tune. Special symbols for writing questions and answers in chemistry, German, French, Italian, and Spanish are included. The lessons can be edited easily and also can be printed out for reference.



The manual points out that the very act of writing questions and answers, and thinking about hints helps you memorize the material. In studying for his ham-radio operator's license, my son found it to be an effective aid.

You can take advantage of a variety of study methods. Answer the questions with or without hints. Work backwards if you like, starting with answers and giving the questions. You can elect to have the material presented in order or at random, and even use a multiple-choice format (automatically created by the computer, using other answers as alternative choices).

As powerful and complex as it is, *Remember!* is also friendly—from the demonstration program to the crisp screen layouts. It's easy to switch from one portion of the toolkit to another and get help whenever needed.

Our few complaints have to do with its limitations—questions may not exceed 79 characters, 19 for answers, and only 20 questions are permitted for each lesson. Hints must be all visual, all verbal, or all auditory. Perhaps most frustrating is that answers and questions must

be typed in *exactly* as originally entered.

Still, in spite of these few flaws, *Remember!* could very well serve as a model for other manufacturers and programmers to follow. It provides a strategy for study and building memory that will come in handy. The only question, which you have to answer yourself, is whether \$80 is too much to spend on such strategy.

—TONY MORRIS

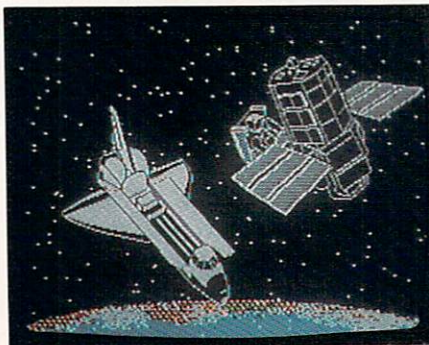
TAKE 1

HARDWARE REQUIREMENTS: Apple IIe/IIc
MANUFACTURER: Baudville
PRICE: \$59
MANUFACTURER'S SUGGESTED AGE: 10+

Creating animation is a time-consuming and exacting art. *TAKE 1* simplifies the process and puts it within reach of Apple owners. It does for the Apple what *Movie Maker*, from Simon & Schuster, did for the Atari: transforms it into an animation station. As simple as the process may be compared to the real thing, it still took me the better part of a morning to make my first computer "movie."

The cute demonstration program may tempt you to get fancy right off the bat. But resist the animated acrobatics at first. Learning *TAKE 1* is like learning how to use a new, sophisticated word-processing program. The first of the program's five sections teaches you to make or edit background pictures and actors. (For best results, use Baudville's compatible drawing program, *Blazing Paddles*.) In the second section, actors are made and programmed to move. Placed in appropriate backgrounds, these actors make up a frame. A sequence of frames makes a scene; and several scenes make a movie.

It's a little complicated the first time through, but not impossible. With my help and frequent remind-



ers to keep it simple, my 9-year-old daughter made a movie in an hour—a bicyclist racing through the countryside to a finish line surrounded by cheering fans. She felt comfortable enough to tackle a new movie the next day, all by herself.

For an extra \$30 you can get *Actors and Actions*, an animated-shape library that furnishes characters to use with *TAKE 1*. Use this and another Baudville character disk (*Heroes and Villains*) to cut down on some time-consuming tasks.

You can edit your movie at any point along the way, and even the finished "take" can be changed easily. Most of the instructions appear on the screen as needed and a HELP screen is always available. It's the few missing commands that kept us referring back to the manual.

Overall, you'll have to put a lot of effort and time into this package. But what it takes in concentration, it returns in creative satisfaction.

—CATHY FRANK

GAMES

Galactic Adventures

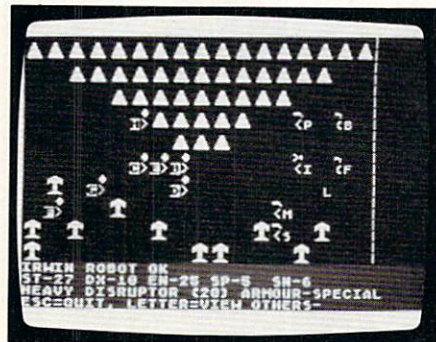
HARDWARE REQUIREMENTS: Reviewed on Atari. Also for Apple II series.
MANUFACTURER: S.S.I.
PRICE: \$59
CRITIC'S SUGGESTED AGE: 12+

This amazing game, a sequel to S.S.I.'s now-discontinued *Galactic Gladiators*, is the most complex and enjoyable role-playing adventure ever. It's the first game I've played that surpasses the *Wizardry* series. An outstanding combat system, a wide-ranging universe to explore, and a variety of characters and action, all make for first-rate play.

You start out by creating a leader and choosing from a variety of races from across the known galaxy. This hero may specialize in handling one or more of over a dozen weapons, plus have other skills, such as healing abilities or star-pilot experience.

With limited funds, you set out to gather other adventurers. Pay salaried voyagers, use clones modeled after yourself, or buy special creatures such as fighting robots or skilled missile-throwing "Orangaphins" (half dolphin, half orangutan).

You gain experience in a variety of ways. Try wandering the streets of whatever spaceport you happen to be visiting. Buy weapons and other tools of the trade, then go out into the streets, where you'll encounter



other beings. Talk with them to obtain jobs (use your special skills for pay), barter for trade goods, ask them to join your band, or fight them to build up your combat experience and weapon skills.

If the planet you're on isn't to your liking, buy a spacecraft (very expensive) or fly as a passenger to another world. If you dare (and if your characters are advanced enough), try taking a job for one of the four interstellar government agencies. They'll send you on dangerous missions where you can quickly rise to higher levels of expertise.

The game is complex, takes months to play, and offers the best time I've had with a computer. What's more, once you begin to tire of the adventures supplied in the program, there's a first-rate construction set, which allows you to build your own worlds for further adventures. This game is a necessity for every dedicated adventurer, and an excellent introduction for beginners who haven't tried their hand at role-playing games.

The Hitchhiker's Guide to the Galaxy

HARDWARE REQUIREMENTS: Reviewed on Apple II series. Also for Macintosh, Atari, C 64, IBM PC/PCjr, TI-99/4A.

MANUFACTURER: Infocom

PRICE: \$39 (Apple, IBM, TI); \$34 (Atari, C 64)

CRITIC'S SUGGESTED AGE: 14 +

First came Douglas Adams' brilliant, satirical, science-fiction radio program, *The Hitchhiker's Guide to the Galaxy*. Then came a best-selling book, more books, a TV series, and a soon-to-be-released movie. Now, there's a computer game based on the original story.

Who else but Infocom designer Steve Meretzky (author of the comic science adventure *Planetfall*) could create this difficult but rewarding

HOW TO PUT A PLATYPUS UNDER YOUR SPELL



No one loves getting wet more than a duck-billed platypus. (That's pronounced 'plat-i-pus.') So if you want to make a platypus happy in **WISHBRINGER™**, Infocom's amazing interactive magic adventure, just type in a magic spell: **PICK UP THE MAGIC ROCK AND THE UMBRELLA. OPEN THE UMBRELLA, THEN WISH FOR RAIN.**

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WHAT'S IN STORE SOFTWARE REVIEWS

text adventure? As the only surviving earthling, you wander through the galaxy in search of truth and the meaning of life (or whatever passes for it amidst the stars). By discovering how to teleport from a planet to a starship, or obtain a "Babel fish" from a vending machine (allow at least two hours for that), you'll slowly grow to be a bona fide hitchhiker, worthy of survival in the galaxy.

This is a funny game. But, like all Infocom adventures, it often is frustrating. There are many steps to follow and so many puzzles to solve that you should count on at least 100 hours of game time to finish it. Still, if you're willing to tough it out, this is one of the best examples of interactive fiction around. (See interview with Adams in this issue.)

The Ancient Art of War

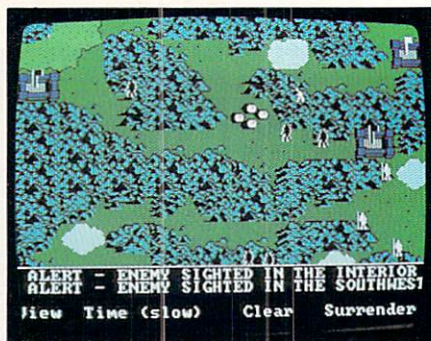
HARDWARE REQUIREMENTS: IBM PC/PCjr. Planned for Apple II series, Macintosh.

MANUFACTURER: Broderbund

PRICE: \$44

CRITIC'S SUGGESTED AGE: 12+

Broderbund shook the gaming tree with *Operation Whirlwind* last year,



a real-time simulation of World War II combat. Now it's come up with another approach to military simulation. *The Ancient Art of War* is a challenging strategic/tactical game, good for a variety of skills and ages. By using built-in scenarios and by fighting against historical opponents (Napoleon, Genghis Khan, Alexander, Caesar, etc.) players can generate hundreds of different games, and alter existing confrontations. Using the construction mode, they can build maps, armies, and campaigns from scratch.

Perhaps the game's best feature is the superb use of animated graphics to represent combat. Characters

Software only you could love

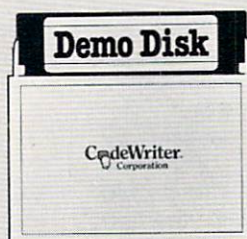
You think there's a big market for a program to keep your records EXACTLY the way you'd like them — only 100 times faster? Not very likely. How about an adventure game with the mad wizards named after the kids in your 6th grade class? Forget it. Maybe a really slick program to calculate and print bowling scores — with all those crazy side bets YOUR league loves? Don't look for it in a store.

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walk, run, fight, shoot arrows, retreat, advance, or hold their ground, all in lifelike movements. Playtesters actually applauded the first time a battle was waged!

Players should be sure to experiment with the program before getting down to serious play. The documentation, while fascinating, leaves some commands unclear, especially during close combat. This is, however, a first-rate introductory war game. Advanced players may find it a limited but entertaining diversion. The game has no two-player option, but is suitable for team play.

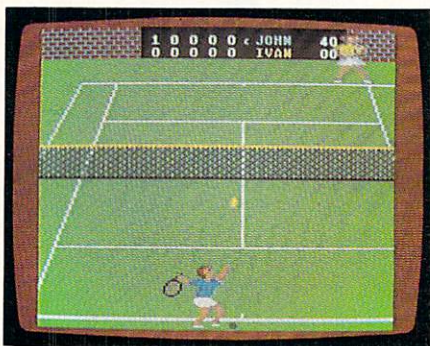
On-Court Tennis

HARDWARE REQUIREMENTS: C64.

MANUFACTURER: Gamestar

PRICE: \$34

CRITIC'S SUGGESTED AGE: 10 +



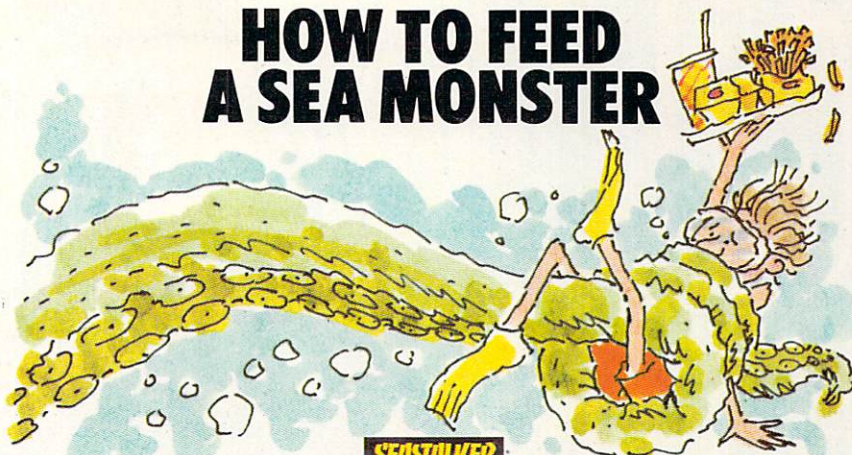
As computer-game designers develop new techniques and graphic skill, sports simulations are on the cutting edge of their advances. *On-Court Tennis* does for this sport what Electronic Arts' *One-on-One* did for basketball. It gives players the chance to experience a fair approximation of the real thing.

This superb tennis simulation has potential for long-lasting play because it's so demanding on gamers. One or two players choose from among four pros modeled after world-class champions, complete with their playing styles, attributes, and faults. Set match length (one, two, or three sets to win) and court surface (clay, grass, or hard). The joystick controls the rallies—every serve and shot can be varied for speed, angle, and direction.

A fast-paced and exciting game, *On-Court Tennis* demands practice and dedication to excel. But the better you get, the better the computer becomes, so you can't just breeze by, even as an expert. As your skills improve, you'll be able to drive the ball, lob shots, slice, and achieve a fair degree of expertise in ball placement.

—REVIEWS BY JAMES DELSON

HOW TO FEED A SEA MONSTER



First, locate a sea monster. (The best place to find one is in SEASTALKER™, the brand-new undersea story from Infocom's interactive fiction line.)

Next, type in your command: GET OUT OF THE SUBMARINE AND FEED THE CATALYST CAPSULE TO THE MONSTER. Then, swim for your life! Because the trouble with feeding sea monsters is, the monster might decide to feed on you!

There's no telling what will happen next in SEASTALKER. Because, like all of Infocom's interactive fiction, SEASTALKER's designed so that

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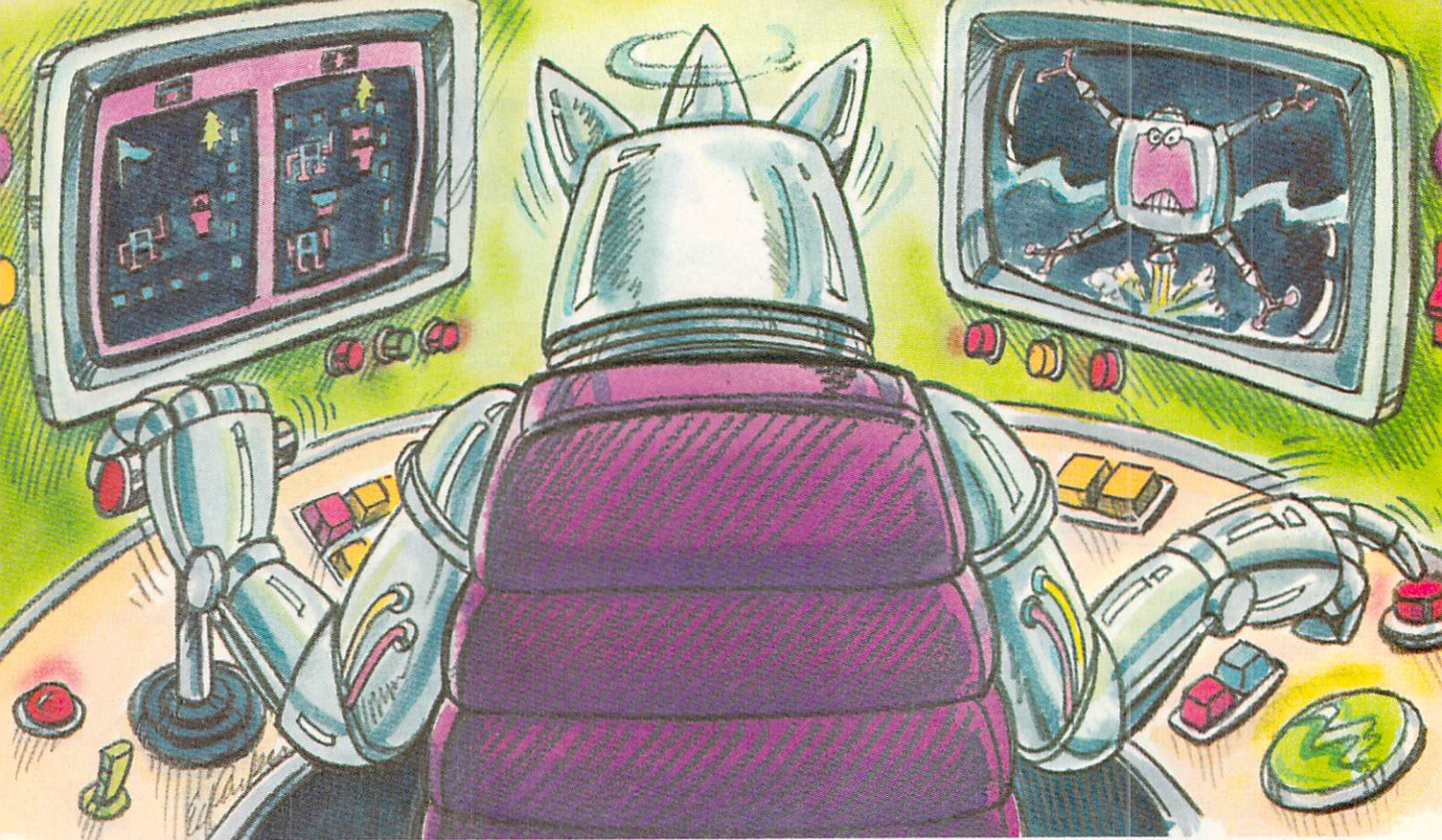
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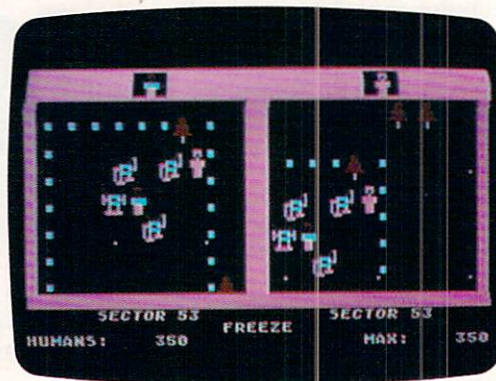
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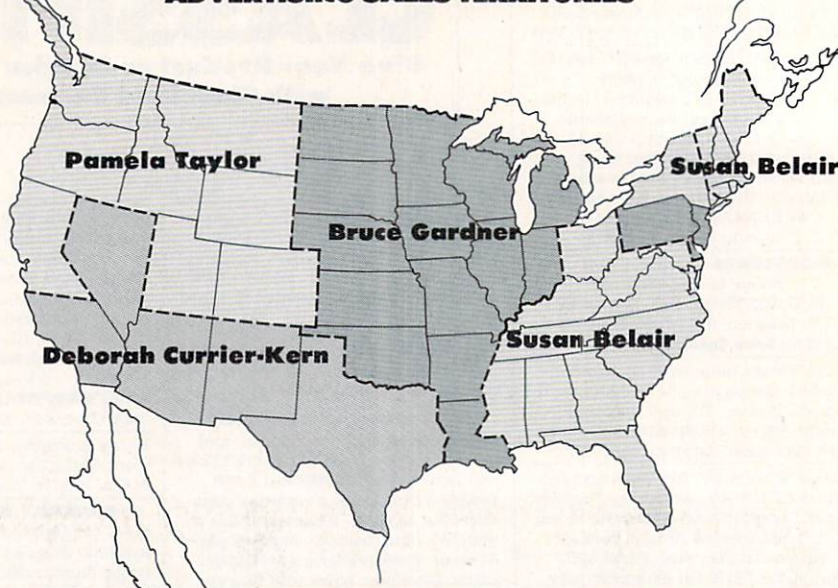
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Reader Service No.	Advertiser Index	Page No.
1	Activision	13
2	Adam User's Group	85
	Apple	C2, 1
	Batteries Included	5
3	Baudville	2
4	Bytes of Whizdom	77
5	C & D Enterprises	84
6	Classic Covers	12
	Classified	86, 87
7	CodeWriter Corp.	21
8	CodeWriter Corp.	80
	Commodore	C4
9	Comp Doc, Inc.	84
10	CompuServe	19
11	Computer Direct	26
12	Computer Direct	27
13	East Hampton Industries	77
14	ExperCamp	85
15	Extended Software Co.	83
16	Family Discount Computer Products	23
	Get Smart Educational Software	83
17	Groler Electronic Publishing	11
18	Groler Electronic Publishing	24
19	Groler On Line Division	25
	Halix Institute	83
20	Infocom	77
21	Infocom	79
22	Infocom	81
23	M.W. Ruth Co.	85
24	My Child's Destiny	83
25	Nibble Notch	21
	North Hills Corp.	83
	North Hills Corp.	85
26	O.R.O. Enterprises	84
27	Precision Data Products	84
28	Professor Corp.	81
29	Protecto Enterprises	28
30	Protecto Enterprises	29
31	Public Domain, Inc.	84
32	Quinsept, Inc.	84
	Scarborough Systems, Inc.	7
33	Scholastic, Inc.	63
34	Scholastic, Inc.	64
35	Scholastic, Inc.	82
36	Sierra On-Line	9
37	subLogic	C3
38	Timeworks, Inc.	15
	Ultrabyte	84
39	Unisource Electronics	21
40	VMC Software	85
41	Verbatim Corp.	30
42	York 10 Computerware	84

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31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48
49	50	51	52	53	54
55	56	57	58	59	60
61	62	63	64	65	66
67	68	69	70	71	72
73	74	75	76	77	78
79	80	81	82	83	84
85	86	87	88	89	90
91	92	93	94	95	96
97	98	99	100	101	102
103	104	105	106	107	108
109	110	111	112	113	114
115	116	117	118	119	120
121	122	123	124	125	126
127	128	129	130	131	132
133	134	135	136	137	138

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13	14	15	16	17	18
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25	26	27	28	29	30
31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48
49	50	51	52	53	54
55	56	57	58	59	60
61	62	63	64	65	66
67	68	69	70	71	72
73	74	75	76	77	78
79	80	81	82	83	84
85	86	87	88	89	90
91	92	93	94	95	96
97	98	99	100	101	102
103	104	105	106	107	108
109	110	111	112	113	114
115	116	117	118	119	120
121	122	123	124	125	126
127	128	129	130	131	132
133	134	135	136	137	138

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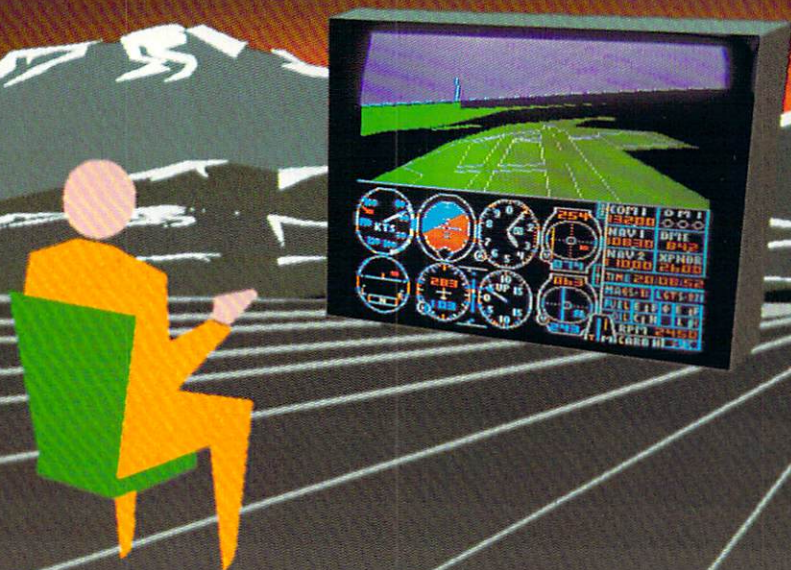
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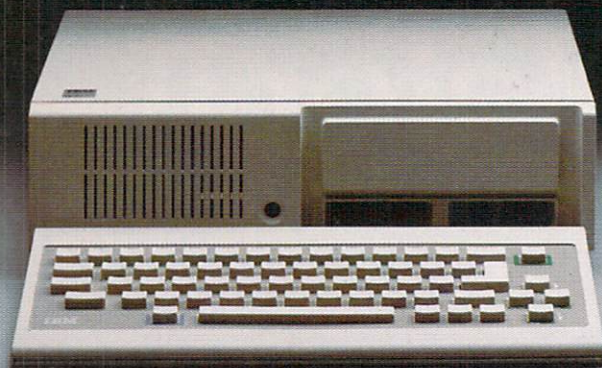
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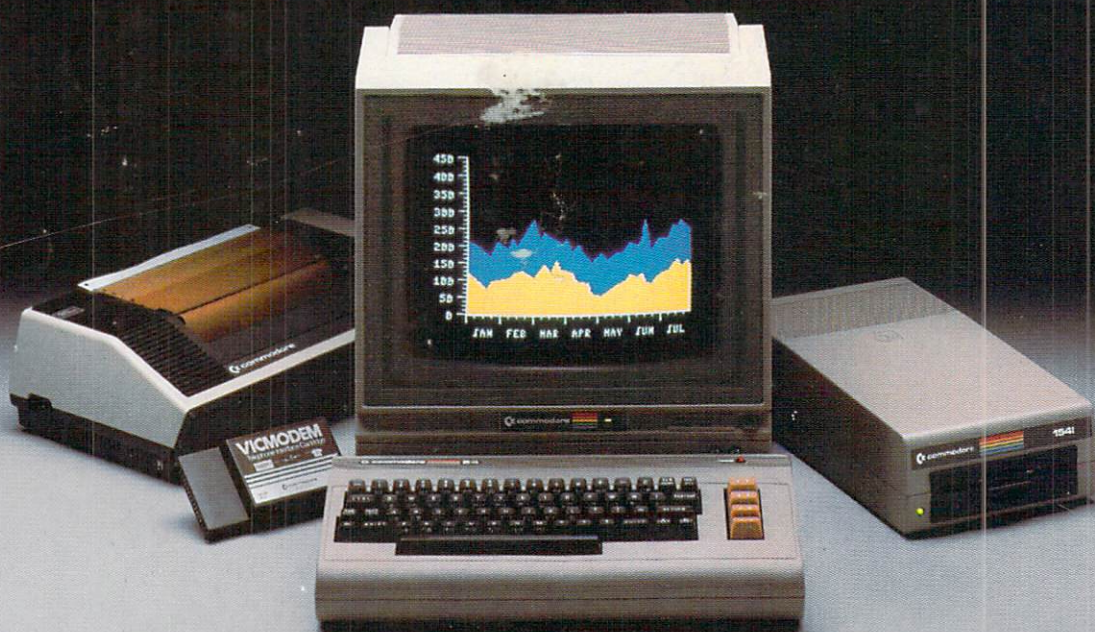
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